CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY

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CAMBRIDGE, MASSACHUSETTS, U.S.A.
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CONTENTS

1. Descriptions of New Plants, Chiefly Gamopetalae, collected in Mexico by C. G. Pringle in 1889 and 1890. By B. L. Robinson.

2. Descriptions of New Plants collected in Mexico by C. G. Pringle, in 1890 and 1891, with Notes upon a few other Species. By B. L. Robinson.

3. Additions to the Phaenogamic Flora of Mexico, discovered by C. G. Pringle in 1891–92. By B. L. Robinson and H. E. Seaton.

4. New and little known Plants collected on Mount Orizaba in the Summer of 1891. By Henry E. Seaton.

5. The North American *Sileneae* and *Polycarpeae*. By B. L. Robinson.

6. I. The North American *Alsineae*.
   II. Descriptions of New and hitherto Imperfectly Known Plants contained in C. G. Pringle's Mexican Collections of 1892 and 1893.
   III. Notes upon the Genus *Galinsoga*.
   IV. Miscellaneous Notes and New Species.
   By B. L. Robinson.

7. Further New and Imperfectly Known Plants collected in Mexico by C. G. Pringle in the Summer of 1893. By B. L. Robinson and J. M. Greenman.

8. New Plants collected by Messrs. C. V. Hartman and F. E. Lloyd upon an Archaeological Expedition to Northwestern Mexico under the Direction of Dr. Carl Lumholtz. By B. L. Robinson and M. L. Fernald.

9. I. On the Flora of the Galápagos Islands, as shown by the Collections of Dr. G. Baur.
   II. New and Noteworthy Plants, chiefly from Oaxaca, collected by Messrs. C. G. Pringle, L. C. Smith, and E. W. Nelson.
   III. A Synoptic Revision of the Genus *Lamourouxia*.
   IV. Miscellaneous New Species.
   By B. L. Robinson and J. M. Greenman.

10. I. Revision of the Genus *Tridax*.
II. Synopsis of the Mexican and Central American Species of the Genus *Mikania*.
III. Revision of the Genus *Zinnia*.
IV. Revision of the Mexican and Central American Species of the Genus *Calea*.
V. A Provisional Key to the Species of *Porophyllum* ranging North of the Isthmus of Panama.
VI. Descriptions of New and Little Known Phanerogams, chiefly from Oaxaca.
By B. L. Robinson and J. M. Greenman.

11. I. Revision of the Mexican and Central American Species of *Houstonia*.
II. Key to the Mexican Species of *Liabum*.
III. Descriptions of New or Little Known Plants from Mexico.
By J. M. Greenman.

12. I. A Systematic Study of the United States and Mexican Species of *Pectis*.
II. Some Rare and Undescribed Plants collected by Dr. Edward Palmer, at Acapulco, Mexico.
By M. L. Fernald.

13. I. Revision of the North American and Mexican Species of *Mimosa*.
II. Revision of the North American species of *Neptunia*.
By B. L. Robinson.

14. I. Revision of the Mexican and Central American Species of *Galium* and *Relbunium*.
II. Diagnoses of New and Critical Mexican Phanerogams.
By J. M. Greenman.

15. I. *Eleocharis ovata* and its American Allies.
II. *Scirpus Eriophorum* and some Related Forms. With 1 plate.
By M. L. Fernald.

16. I. Revision of the Genera *Montanoa*, *Perymenium*, and *Zaluzania*.
By B. L. Robinson and J. M. Greenman.
II. Synopsis of the Genus *Verbesina*, with an analytical Key to the Species.
By B. L. Robinson and J. M. Greenman.
III. Some new Species, extended Ranges, and newly noted Identities among the Mexican Phanerogams. By J. M. Greenman.

17. I. Revision of the Genus *Gymnolomia*.
II. Supplementary Notes upon *Calea*, *Tridax*, and *Mikania*.
By B. L. ROBINSON and J. M. GREENMAN.

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II. Synopses of the Genera *Jaegeria* and *Russelia*. By B. L. ROBINSON.
III. New Dioscoreas from Mexico. By E. B. ULINE.
IV. New Phaenogams, chiefly Gamopetalae, from Mexico and Central America. By B. L. ROBINSON.

19. I. A Synopsis of the Mexican and Central American Species of *Salvia*.
II. A Revision of the Mexican and Central American Solanums of the Subsection *Torvaria*.
III. Some undescribed Mexican Phanerogams, chiefly *Labiatae* and *Solanaceae*.
By M. L. FERNALD.

20. I. Synopsis of the Genus *Melampodium*.
II. Synopsis of the Genus *Nocca*.
III. New Species and newly noted Synonymy among the Spermatophytes of Mexico and Central America.
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x.	Proc. Am. Acad. (Boston)			xxxii. 1– 51.	2 Dec.,	1896.
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xiv.	"	"	"	" 455–489.	2 July,	1898.
xv.	"	"	"	xxxiv. 485–503.	29 April,	1899.
xvi.	"	"	"	" 507–578.	19 May,	1899.
xvii.	Proc. Bost. Soc. Nat. Hist. (Boston)			xxix. 87–108.	24 Aug.,	1899.
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xxiii.	Am. Jour. Sci. (New Haven) ser. 4,			xiv. 167–194.	1 Sept.,	1902.
xxiv.	Proc. Am. Acad. (Boston)			xxxviii. 77–269.	28 Oct.,	1902.
xxv.	"	"	"	xxxix. 69–120.	25 Sept.,	1903.

ERRATA

i. 166, line 14, for *perymenoides* read *perymenioides*.
iii. 105, " 28, " Moç. *read* Moc.
" 106, " 20, " 4112 *read* 4142.
" 111, " 9, " *cervariaefolius* read *cervariaefolia*.
" " " 26, " Watson *read* Gray.
v. 136, " 29, " *Xanthus* read *Xantus*.
" 141, " 38, " Tolon *read* Jolon.
" 142, " 27, " not *read* seldom.
" 149, " 12, " *apetela* read *apetala*.
" 155, " 32, " *Eryogonum* read *Eriogonum*.
vi. 279, " 4, " 170 *read* 169.
" 280, " 27, " Moç. *read* Moc.
" 282, " 5, " Smith *read* Cyrill.
" 285, " 23&24 " Fl. Germ. i. *read* Deutschl. Fl.
" 286, after line 37 insert = = Leaves broader, ovate or broadly oblong, seldom an inch in length.
" 287, line 39, for = = read = = =.
" 311, at head of page insert + + Corolla much reduced or wanting.
" 312, line 29, after **S. macrotheca** insert HEYNH.
" 314, " 4, 27, 29, for TOMENTOSA read TOMENTOSUM.
" " " 19, 28, for *aesculifolia*, HBK. read *aesculifolium*, DC.
" 315, " 27, for CALOGANIA read COLOGANIA.
vii. 386. " 9, " xxvi. *read* xxvii.
" 388, " 1, " Mort. *read* Mart.
" 390, " 15, " Moç. *read* Moc.
viii. Title page and 114, for C. E. LLOYD read F. E. LLOYD.
ix. 135, line 22, for Edmonstone *read* Edmonston.
" 145, " 18, " *A. brachiata* read *L. brachiata*.
" " " 34, " *Andersonianum* read *Anderssonianum*.
" " " 43, " *obovatus* read *obovata*.
" 146, " 22, " Benth. and Hook. *read* Humb. & Bonpl.
" " " 27, " *Charanta* read *Charantia*.
" " " 56, " Ands. *read* Cass.
" 147, " 6, " DC. *read* Sch. Bip.
" " " 14, " Ands. *read* (Ands.).
" " " 16. " *Darwinii* Hook. fil. read *Darwini* (Hook. f.).
" " " 17, " Hook. fil. *read* Gürke.
" " " 54, " *squarrulosa* read *squarrulosus*.
" " " 55, " *Caraccasanus* read *caracasanus*.
" 149, " 12, " *Ægyptiaca* read *aegyptica*.
" " " 24, " *farinosum* read *formosum*.
" " " 38, " *Usneoides* and *usneoides*.
" 150, " 17, " 5494 *read* 5094.
" 160, " 39, " *L. violacea* read *J. violacea*.
" 164, " 44, " *macrocarpus* read *macrocarpa*.
x. 3, " 20, " *C. dubia* read *T. dubia*.
" 12, " 38, " Ayres *read* Aires.
" " " " " 4433 *read* 4933.
" 28, " 10, " 2½ *read* 1½.
" 34, " 3, " **Discorea** read **Dioscorea**.
" 49, " 28, " 6215 *read* 6214.
xi. 284, " 28, " **croftiæ** read **Croftiae**.
" 289, " 28, " Jose *read* José.
" 295, " 20, " of *read* on.
" 298, " 3, " Pedrigal *read* Pedregal.
" 299, " 31, " on *read* in.
" 300, " 17, " Pedrigal *read* Pedregal.

xi. 300, line 25, for scorpoid *read* scorpioid.
" 303, " 18,24, " Staminodea *read* staminodia.
" 310, " 22, " Pedrigal *read* Pedregal.
xii. 58, " 23, " *abrotinoides* read *abrotanoides*.
" 86, " 6, " Tuscan *read* Tucson.
xiii. 326, " 19 et seq. reduce nos. 52–67 each by one.
" 328, " 8, for * * * read + + +.
" " " 10, " + read ++.
" " " 27, " + + read ++ ++.
" " " 29, " ++ read =.
" 329, " 11, " ++ ++ read = =.
" " " 33, " ++ ++ ++ read = = =.
" 330, " 7, " + + + read ++ ++ ++.
" " " 28, " + + + + read ++ ++ ++ ++.
" " " 30, " ++ read =.
" " " 36, " ++ ++ read = =.
" 331, " 6, " ++ ++ ++ read = = =.
" 332, " 32, " S. Missouri *read* Ind. Terr.
xiv. 457, " 22, " **aparine** read **Aparine**.
" 464, " 30, " *abstipum* read *obstipum*.
" 465, " 15, " Saskatchawan *read* Saskatchewan.
" 473, " 3, " dm. *read* cm.
" 485, " 5, " in *read* on.
xv. 494, " 18, " Bav. *read* Par.
xvi. 515, " 26, " 3985 *read* 3935.
" 529, " 24, " **strigillosa** read **strigillosum**.
" 559, " 18, " 83 *read* 88.
" 561, " 32, " *verbascifolia* read *turbacensis*.
" 565, " 30, " *Hookeri* read *Hookerii*.
xvii. 95, " 19, " *scolosperum* read *Scolospermum*.
xix. 496, " 21, " MOCINOI read MOCINOI.
" 507, " 3, " *botryodes* read *botryoides*.
" 517, " 21, " + *read* + +.
" 543, " 4, " *lupulus* read *Lupulus*.
" 559, " 33, " 3446 *read* 3440.
" 571, " 40, " **truncata** read **truncatum**.
xxi. 498, " 10, " **Seleriana** read **Selerianus**.
" 504, " 15, " *macrocenteron* read *macrocentron*.
xxiv. 85, " 15, " *rungiferina* read *rangiferina*.
" 98, " 37, " 430 *read* 420.
" " " 38, " *L. Farlowii* Foster read *Lithothamnium Farlowii*, Foslie.
" 113, " 6, " *paradisiae* read *paradiseae*.
" 122, " 28, " *ayennense* read *cayennense*.
" 129, " 3, " SURANIMENSIS read SURINAMENSIS.
" 138, " 27, " *Illicebrum* read *Illecebrum*.
" 159, " 17, " *Nicholsonii* read *Nicholsoni*.
" 165, " 24, " *incanus* read *albescens*.
" 174, " 23, " I. TILIACEUS read H. TILIACEUS.
" 199, " 17, " MINOR read MINUS.
" 214, " 28, 31, } for *Lorentia* read *Lorentea*.
" 215, " 11, 15, }
" 230, " 17, for Andersonii *read* Anderssonii.
" 233, " 6, " Andersoni *read* Anderssoni.
" " " 15, " Andersonii *read* Anderssonii.
" 238, " 28, " a very few plants which are not found *read* a very few plants of the Old World which are not found.
" 241, " 13, " tileaceus *read* tiliaceus.
" 263, " 11, " Ossea *read* Ossaea.
xxv. 116, " 35, " *Parker* read *Palmer*.
" 120, " 17, " a Nicoya *read* à Nicoya.

INDEX

TO THE

CONTRIBUTIONS FROM THE GRAY HERBARIUM

NEW SERIES, Vol. I (Nos. 1–25)

COMPILED BY M. A. DAY
LIBRARIAN OF THE GRAY HERBARIUM

NAMES of new species are in **full face** type. The Roman numeral gives the number of the Contribution, the Arabic the page.

Those who wish to put these Contributions into the form which will permit the easiest reference, will do well to have them bound in their proper sequence and then enter upon each page in Roman numerals the number of the Contribution to which it belongs. This will be found to facilitate greatly the use of the index.

In citing the Contributions, however, authors should *in all instances* give the name, volume, and page of the *serial*. For example: *Verbesina Mandoni*, Sch. Bip. Proc. Am. Acad. xxxiv. 547, *not* Contributions from the Gray Herbarium, new series, xvi. 547.

Abutilon, xxiv. 173.
Anderssonianum, ix. 145; xxiv. 173, 231.
attenuatum, iii. 104.
depauperatum, xxiv. 173, 231.
Acacia, xxiv. 147, 237.
adenantheroides, xiii. 320.
albida, xxiv. 147.
canescens, xiii. 325.
Cavenia, xxiv. 147.
farnesiana, xxiv. 147, 228.
fasciculata, xiii. 318, 319.
flexuosa, xxiv. 147.
hirta, xiii. 323.
lutea, xiii. 332, 333.
macrantha, ix. 146; xxiv. 147, 228.
prosopoides, xiii. 316.
sp., xxiv. 147, 229.
tenuiflora, xiii. 321.
tortuosa, ix. 146; xxiv. 147, 229.
var. glabrior, xxiv. 147.
Acalypha, ix. 138; xxiv. 161, 255.
acapulcensis, xii. 87.
Adamsii, xxiv. 161, 162, 230.
albemarlensis, xxiv. 162, 163, 230.
Baurii, ix. 139, 144, 148; xxiv. 161, 163, 230.
Acalypha (*continued*).
chathamensis, xxiv. 162, 163, 230.
cordifolia, xxiv. 162, 163, 230.
diffusa, ix. 139; xxiv, 162, 163, 230.
erubescens, vii. 393.
filifera, vii. 322.
flaccida, xxiv. 161, 164, 230.
glandulifera, ix. 164.
hypogaea, vi. 322.
indica, xii. 87.
oreopola, xxv. 82.
parvula, ix. 139; xxiv. 162, 164, 230.
var. cordifolia, ix. 148; xxiv. 163, 165.
var. flaccida, ix. 148; xxiv. 164, 165.
var. genuina, ix. 148; xxiv. 164.
var. procumbens, ix. 148; xxiv. 163, 164.
var. pubescens, ix. 148; xxiv. 164, 165.
var. reniformis, xxiv. 164.
var. strobilifera, ix. 148; xxiv. 164.
vars. xxiv. 79.
polystachya, vi. 322.

Acalypha (*continued*).
reniformis. ix. 139; xxiv. 162, 164, 230.
sericea, xxiv. 162, 164, 230.
sp.. xxiv. 165, 230.
spicata. xxiv. 162, 164. 230.
strobilifera, xxiv. 162, 164, 230.
velutina, xxiv. 162, 164, 230.
var. minor, xxiv. 165, 230.
Acanthaceae, xi. 303; xxiv. 203, 243.
Acanthocarpae, ix. 150.
Acanthocarpha. xvi. 512.
Acanthospermum. xxiv. 208, 238.
brasilum. xx. 465.
hispidum, xxiv. 209.
humile. xx. 466.
lecocarpoides, ix. 141. 146; xxiv. 208, 235, 248.
microcarpum, xxiv. 208, 235, 238.
Acaulae, xix. 508.
Acerates Pringlei, xvi. 570.
Achyrocline deflexa, ix. 153.
Acmella hirta. xviii. 317.
Acnistus, xxiv. 198.
ellipticus, ix. 142, 147; xxiv. 198, 233.
insularis, xxiv. 198, 233.
n. sp., ix. 147.
sp., ix. 142.
Acroarrhenae, xxii. 447.
Acrolasia squalida, xxiv. 178.
Acrostichum, xxiv. 104.
aureo-nitens, ix. 149; xxiv. 104, 224.
aureum, xxiv. 104, 224, 241.
caudatum, xxiv. 261.
Langsdorfii. xxiv. 104.
lepidopteris. xxiv. 112.
muscosum. xxiv. 104, 224.
polypodioides. xxiv. 112.
viscosum, xxiv. 105, 224.
Actinomeris, xvi. 534, 536, 537.
alba, xvi. 566.
helianthoides, xiv. 549.
var. Elliottii, xvi. 549.
" Nuttallii, xvi. 549.
heterophylla, xvi. 540.
longifolia, xvi. 545.
nudicaulis, xvi. 542.
oppositifolia, xvi. 549.
ovata. xvi. 539.
pauciflora. xvi. 542.
pedunculosa. xvi. 540.
squarrosa. xvi. 565.
stricta. xvi. 545.
tetraptera, xvi. 539.
Wrightii, xvi. 541. 542.
Acuan illinoensis, xiii. 334.
Adenarium, vi. 291.
peploides. vi. 291.
Adhatoda candicans, x. 41.
Adiantum, xxiv. 105.
aethiopicum, xxiv. 105, 224.
concinnum, xxiv. 105, 224.
cuneatum, xxiv. 105.
Henslovianum, ix. 149; xxiv. 105, 224.
incisum, xxiv. 105, 224.
intermedium, xxiv. 261.
Kaulfussii, xxiv. 105, 224.
parvulum. xxiv. 106, 224.
patens, xxiv. 106, 224.
prionophyllum. xxiv. 106, 224.
sessilifolium, xxiv. 105.
Aeginetia longiflora. xi. 293.
Aegiphila brachiata, xiv. 485.
pacifica, xiv. 485.
Aeschynomene, vi. 315.
amorphoides, vi. 315.
conferta, ii. 167.
petraea, ii. 166.
Agaricini, xxiv. 83.
Agaricus alneus, xxiv. 83.
Agave brunnea, vii. 394.
collina, xi. 296.
dasylirioides. xvi. 567, 568.
intrepida, xvi. 567, 568.
potosina, xvii. 393.
serratula, xi. 296.
Agerateae, ix. 151; xxv. 93.
Ageratum, xxiv. 209.
conyzoides, ix. 146; xvii. 105; xxiv. 209.
latifolium, xxiv. 209, 235.
lucidum, xx. 475.
rhytidophyllum, xx. 476.
stachyofolium, xx. 476.
Agrostemma, v. 126, 152.
apetala. v. 151.
Coronaria. v. 152.
Githago. v. 152.
triflora. v. 149.
Agrostis stolonifera. iv. 122.
verticillata, iv. 122.
virginica, xxiv. 125.
vulgaris. iv. 122.
Aizoaceae. xxiv. 143. 241, 243.
Alatipes. xvi. 535, 538.
Albae, xxiii. 169, 170, 179. 190.
Alcina minor, xx. 463.
ovalifolia, xx. 463.
ovatifolia, xx. 463.
Alcoceria, xxi. 493.
Pringlei, xxi. 493.
Aldama Montanoa, xvi. 515.
Alectoria sarmentosa, xxiv. 86.

Alectoroctonum, xiv. 479.
Algae, xxiv. 79, 89.
Allium Schoenoprasum, xxiii. 184.
Allocarpus integrifolius, x. 26.
sabazioides, x. 22.
scabrifolius, x. 28.
Allochlamys Darwinii, xxiv. 137.
Alnus, xxiii. 189.
Alomia, ix. 152.
Alsine, vi. 298.
arctica, vi. 305.
var. breviscapa, vi. 305.
biflora, vi. 304.
var. carnosula, vi. 305.
" rigidula, vi. 305.
brevifolia, vi. 299.
Drummondii, vi. 289.
glabra, vi. 299.
groenlandica, vi. 298.
hirta, vi. 303.
macrocarpa, vi. 305.
macropetala, vi. 301.
media, vi. 282.
Michauxii, vi. 302.
microsperma, vi. 301.
nardifolia, vi. 294.
Nuttallii, vi. 289.
palustris, vi. 298.
patula, vi. 301.
peploides, vi. 291.
Pitcheri, vi. 301.
propinqua, vi. 303.
Rossii, vi. 303.
rubella, vi. 303.
var. hirta, vi. 303.
squarrosa, vi. 306.
stricta, vi. 303.
tenella, vi. 300, 301.
verna, vi. 303.
var. glacialis, vi. 303.
" hirta, vi. 303.
Walteri, vi. 288.
Alsineae, v. 126, vi. 273, 274, 289.
Alsinella ciliata, vi. 306.
crassicaulis, vi. 308.
occidentalis, vi. 307.
saginoides, vi. 308.
Alsophila armata, xxiv. 261.
sp., ix. 149; xxiv. 112.
Altamirania, xxv. 106. Suppl. leaflet.
pachyphylla, xxv. 106.
Altamiranoa, xxv. Suppl. leaflet.
Alternanthera, xxiv. 134.
acaulis, xxiv. 134.
frutescens, ix. 148; xxiv. 138, 140.
radicata, xxiv. 134, 227.
rigida, ix. 143, 148; xxiv. 135, 227.
subscaposa, xxiv. 135, 227.
Amarantaceae, xxiv. 134, 137, 241, 243, 249, 251.
Amaranthus, xxiv. 135.
caracasanus, ix. 147; xxiv. 135, 227.
celosioides, xxiv. 135, 227.
sclerantoides, ix. 139, 147; xxiv. 135, 227.
forma chathamensis, ix. 140; xxiv. 135, 227.
forma hoodensis, ix. 140; xxiv. 135, 227, 248.
spinosus, xxiv. 135, 228.
squarrulosus, ix. 147; xxiv. 135, 228.
urceolatus, xxiv. 136, 228.
viridis, xxiv. 136, 228.
Amaryllidaceae, xxiv. 131.
Amblogyna urceolata, xxiv. 136.
Amblogyne, xxiv. 136.
squarrulosa, xxiv. 135.
Amellus pedunculatus, x. 7.
Ammadenia, vi. 290.
Amphiotis, xi. 286.
Amphiroa, xxiv. 93.
dilatata, xxiv. 93.
Orbigniana, xxiv. 93.
peruana, xxiv. 93.
Amphochaeta, xxiv. 124.
exaltata, xxiv. 124.
Ancistrophora, xvi. 536, 537.
Wrightii, xvi. 565.
Ancistus, xxiv. 198.
Ancyrostemma micranthum, xxiv. 178.
Andrieuxia, quitensis, xvii. 98.
Andromachia, xii. 61.
Deppeana, xi. 293.
Androsace cinerascens, ii. 180.
Angustifoliae, xix. 499; xix. 508; xxi. 499.
Anisacanthus Gonzalezii, xxv. 89, 90.
virgularis, xxv. 90.
Anisophyllum, xxi. 494, 495.
Anoda, xxiv. 173.
acerifolia, ix. 145; xxiv. 173.
hastata, vii. 382; xxiv. 173, 231.
Anotis, xi. 292.
Anthemis globosa, xvi. 530.
lutescens, xvi. 532.
sinuata, xvi. 531.
triloba, xvi. 531.
Anthephora, xxiv. 116.
cuspidata, xxiv. 116.
elegans, ix. 149; xxiv. 116, 225.
Anthericum, xxv. 73.
drepanoides, xxv. 71.
durangense, xxv. 72.
var. trachycaulum, xxv. 72.
echeandioides, xiv. 472.

Anthericum (*continued*).
Humboldtii, xxv. 72.
leucocomum, ix. 168.
nanum, xxv. 73.
Nelsonii, xxv. 72, 73.
platyphyllum, xiv. 472.
Anthoresis, xix. 569.
Apium, xxiv. 184.
Ammi, xxiv. 184.
laciniatum, xxiv. 184, 232.
leptophyllum, xxiv. 184, 232.
Petroselinum, xxiv. 184.
Aplopappus, xxiv. 209.
lanatus, xxiv. 209, 235.
Apocynaceae, xi. 298; xxiv. 185, 243.
Apterocaryon, xxiii. 187.
Michauxii, xxiii. 187, 191.
Arbutus, ix. 166.
glaudulosa, xviii. 309.
Arceuthobium campylopodium, var. β, viii. 121.
robustum, viii. 121.
sp., viii. 121.
Archaetogeron **purpurascens**, xxv. 94.
Archichlamydeae, xxv. 69.
Arctostaphylos arguta, iii. 113; xxi. 497.
attenuata, iii. 113.
Conzattii, xxi. 497.
glabrata, xxi. 497.
rupestris, iii. 112; xxi. 497.
Ardisia cuspidata, xxiv. 263.
Arenaria, v. 129, 152; vi. 275, 289, 291, 309.
aculeata, vi. 294.
alsinoides, vi. 293.
arctica, vi. 304, 305.
var. grandiflora, vi. 305.
Benthamii, vi. 292.
biflora, vi. 304.
Bourgaei, iv. 117.
brevifolia, vi. 299.
var. californica, vi. 300.
buxifolia, vi. 290.
caespitosa, vi. 308.
californica, vi. 300.
calycantha, vi. 286.
canadensis, vi. 312.
capillaris, vi. 294, 296.
var. formosa, vi. 294.
" nardifolia, vi. 294.
caroliniana, vi. 306.
ciliata, vi. 292.
var. humifusa, vi. 292.
compacta, vi. 294, 295.
congesta, vi. 294, 295.
var. subcongesta, vi. 295.
" suffrutescens, vi. 295.
diandra, vi. 310.

Arenaria (*continued*).
diffusa, vi. 293.
Douglasii, vi. 299, 300.
elegans, vi. 303.
Fendleri, vi. 296.
var. diffusa, vi. 297.
" glabrescens, vi. 296, 297.
" subcongesta, vi. 296.
formosa, vi. 294.
Franklinii, vi. 297, 298.
var minor, vi. 297.
Giesekii, vi. 303.
glabra, vi. 288, 298, 299, 328.
groenlandica, vi. 298, 301, 328.
Haenkeana, vi. 290.
hirta, vi. 303.
var. glabrata, vi. 303.
Hookeri, vi. 297.
Howellii, vi. 300.
humifusa, vi. 292.
imbricata, vi 306.
juniperina, vi. 303.
lanuginosa, vi. 293.
laricifolia, vi. 305.
lateriflora, vi. 286, 290.
leptoclados, vi. 292.
macradenia, vi. 296.
var. Parishiorum, vi. 295, 296.
macrocarpa, vi. 305.
macrophylla, vi. 290.
macrotheca, vi. 312.
marina, vi. 311.
Michauxii, vi. 302.
monticola, vi. 292.
nardifolia, vi. 294.
nemorosa, vi. 293.
norvegica, vi. 292.
Nuttalli, vi. 303.
var. gracilis, vi. 304.
obtusa, vi. 304.
paludicola, vi. 298.
palustris, vi. 298.
patula, vi. 288, 290, 301.
pennsylvanica, vi. 290.
peploides, vi. 291.
var. major, vi. 291.
physodes, vi. 291.
Pitcheri, vi. 301.
propinqua, vi. 303.
pungens, vi. 304.
var. gracilis, vi. 304.
Purshiana, vi. 287.
pusilla, vi. 300.
Rafinesquiana, vi. 306.
Rossii, vi. 303.
rubra, vi. 310.
β, vi. 312.
var. marina, vi. 311.

Arenaria (*continued*).
sajanensis, vi. 304.
var. **carnosula**, vi. 305.
" **rigidula**, vi. 305.
saxosa, vi. 293.
var. **cinerascens**, vi. 293.
serpens, iv. 117.
serpyllifolia, vi. 292.
var. tenuior, vi. 292.
setacea, vi. 302.
sitchensis, vi. 291.
squarrosa, vi. 306.
stricta, vi. 301, 303.
var. *a*, vi. 302.
" *β*, vi. 302.
" **texana**, vi. 302.
tenella, vi. 300, 301.
tenuifolia, var. americana, vi. 301.
thymifolia, vi. 287, 304.
ursina, vi. 294.
verna, vi. 302.
β, vi. 300.
var. hirta, vi. 303.
" rubella, vi. 303.
Arenaria § Ammodenia, vi. 291.
§ Merckia, vi. 291.
Aretia, ii. 180.
Argithamnia neo-mexicana, var. **depressa**, xiv. 478.
Aristida, xxiv. 116.
caudata, ix. 149; xxiv. 117.
compacta, xxiv. 117.
divulsa, ix. 149; xxiv. 116, 225.
repens, xxiv. 117, 225.
subspicata, ix. 149; xxiv. 117, 225.
villosa, ix. 144, 149; xxiv. 117, 225.
Aristolochia longecaudata, var. **virescens**, xi. 297.
Arnica, xxv. 115.
Arnicastrum, xxv. 115.
glandulosum, xxv. 115.
var. **vestitum**, xxv. 115.
Arracacia, ii. 169.
nudicaulis, iv. 119.
Arthonia, xxiv. 84.
gregaria, xxiv. 84.
nivea, xxiv. 83, 84.
platyspeilea, xxiv. 83, 84.
sp., xxiv. 84.
Arundinella aleutica, iv. 122.
brasiliensis, iv. 122.
Deppeana, iv. 121, 122.
latifolia, iv. 122.
scoparia, iv. 122.
Asagraya tenuifolia, ix. 168.
Asclepiadaceae, ix. 159; xxiv. 185, 243.
Asclepias, xxiv. 185.
angustissima, xxiv. 185, 232.
Asclepias (*continued*).
jaliscana, vi. 318.
neglecta, xvi. 570.
setosa, vi. 318.
Asphodelus fistulosus, xxi. 492.
Aspidium, xxiv. 106.
acutum, xxiv. 110.
capense, xxiv. 106.
coriaceum, xxiv. 106, 224.
macrophyllum, xxiv. 110.
molle, ix. 149; xxiv. 110.
pectinatum, xxiv. 110.
semicordatum, xxiv. 106, 224.
villosum, xxiv. 110.
Aspilia, xvii. 104; xxv. 102.
aggregata, xxv. 102.
angustifolia, xxv. 103.
buphthalmiflora, xvi. 566.
costaricensis, xvii. 95.
floribunda, xxv. 102.
pachyphylla, xxv. 107.
stenophylla, xxv. 102.
Aspiliopsis, xxv. Suppl. leaflet.
Asplenium, xxiv. 106.
abscissum, xxiv. 107.
anisophyllum, xxiv. 224.
var. latifolium, xxiv. 106.
auritum, ix. 149; xxiv. 106, 224.
var. macilentum, xxiv. 107, 224.
cicutarium, ix. 149; xxiv. 107, 224.
erectum, xxiv. 107.
farinosum, ix. 149; xxiv. 107.
formosum, [ix. 149]; xxiv. 107, 224.
furcatum, xxiv. 107, 224.
lactum, xxiv. 107, 224.
lunulatum, xxiv. 107, 224.
Macraei, xxiv. 107.
marinum, var. auriculatum, xxiv. 106.
myriophyllum, var. divaricatum, xxiv. 107.
nigrescens, xxiv. 106.
nubilum, xxiv. 106.
praemorsum, xxiv. 107.
rhizophyllum, xxiv. 107, 224, 241, 261.
rutaceum, xxiv. 108, 224.
Serra, xxiv. 108, 224.
serratum, xxiv. 108, 224.
subulatum, xxiv. 107.
sulcatum, xxiv. 106.
Astatandra, xiii. 307.
Astephanus, xi. 299.
pubescens, xi. 299.
Aster bullatus, xix. 573.
Engelmanni, i. 176; vi. 330.
var. glaucescens, i. 176.

Aster Engelmanni (*continued*).
var. **paucicapitatus**, i. 176; vi. 330.
jalapensis, xix. 572.
ledophyllus, i. 176.
lepidopodus, viii. 117.
paucicapitatus, vi. 329.
Saturejea, xii. 82.
Xylorhiza, vi. 330.
Astragalus, xxiv. 148.
Edmonstonei, xxiv. 148, 229.
Humboldtii, iv. 118.
Mandoni, iii. 105.
Orizabae, iv. 117.
tolucanus, iii. 104, 115.
Astrostachyae, xxii. 453, 458, 481.
Athenaea, i. 172.
Nelsonii, xix. 567.
viscosa, xix. 567.
Atocion armerioides, v. 128.
Atriplex, xxiv. 134, 237, 252.
sp., xxiv. 134, 227.
Auliscus insignis, xxiv. 90.
Avicennia, xxiv. 194.
officinalis, xxiv. 194, 233, 237.
tomentosa, ix. 147; xxiv. 194.
Axilliflorae, xix. 519.
Ayenia glabra, vi. 314.
Azolla, xxiv. 115, 237.
caroliniana, xxiv. 115, 225.

Baccharis, xxiv. 209.
macrocephala, xvi. 575.
pilularis, xxiv. 209, 235.
Pingraea, var. angustissima, ix. 146; xxiv. 209, 235.
ramiflora, var. squarrulosa, xvi. 576.
squarrosa, xvi. 576.
Steetzii, xxiv. 209, 235.
Baeria, xxv. 115.
Bahia biternata, xxv. 116.
chrysanthemoides, xxv. 116.
glandulosa, xxv. 116.
Pringlei, xi. 309; xvi. 577.
Schaffneri, xi. 310.
xylopoda, xvi. 577.
Balbisia, x. 3.
divaricata, x. 7.
elongata, x. 7.
pedunculata, x. 7.
Baltimora Scolospermum, xvii. 95.
Barkeria elegans, xiv. 476.
Bartolina, x. 3.
Basellaceae, xxiv. 141.
Bassovia, i. 171.
Donnell-Smithii, vi. 320.
macrophylla, i. 171.
mexicana, i. 171.
Bastardia, xxiv. 173.
guayaquilensis, xxiv. 173.
viscosa, ix. 149; xxiv. 173, 231.
Batatas pentaphylla, xxiv. 188.
Batidaceae, xxiv. 141.
Batis, xxiv. 141.
maritima, xiv. 477; xxiv. 141, 228, 237.
Batschia, xi. 300.
Begonia palmaris, vi. 316.
Bellis integrifolia, ii. 172; viii. 117.
orthopoda, viii. 117.
purpurascens, ii. 172.
xanthocomoides, ii. 172.
Bellium minutum, xii. 58.
Beloperone comosa, xiv. 487, 488.
fragilis, ii. 183.
Nelsonii, xiv. 488.
Pringlei, xiv. 487, 488.
Berendtia **levigata**, x. 39.
Betula, xxiii. 167, 168, 189.
alaskana, xxiii. 180–184, 191.
alba, xxiii. 169–179, 183, 184, 189, 190.
forma occidentalis, xxiii. 173, 190.
subsp. **excelsa**, xxiii. 170.
" **latifolia**, xxiii. 170, 181, 191.
a, Tauschii, xxiii. 182.
" **mandchurica**, xxiii. 170, 181, 182, 191.
" **occidentalis**, xxiii. 170.
β, commutata, xxiii. 174.
" **papyracea**, var. cordifolia, xxiii. 171.
" papyrifera, xxiii. 170.
β, cordifolia, xxiii. 177, 190.
" populifolia, xxiii. 170, 191.
" pubescens, xxiii. 170.
ζ, carpatica, xxiii. 191.
" soongorica, xxiii. 185, 191.
β, microphylla, xxiii. 185.
" tortuosa, xxiii. 170, 190.
α, genuina, xxiii. 178.
" verrucosa, xxiii. 170.
α, vulgaris, xxiii. 191.
δ, resinifera, xxiii. 180, 181, 191.
var. **carpatica**, xxiii. 179, 190.
" **cordifolia**, xxiii. 177, 178, 189, 190.
" **glutinosa**, xxiii. 176, 177, 190.

Betula alba, var. glutinosa (*continued*).
forma pendula, xxiii. 177.
var. **minor**, xxiii. 178, 179, 189, 190.
" populifola, xxiii. 191.
" verrucosa, xxiii. 191.
" vulgaris, xxiii. 191.
alpestris, xxiii. 187, 189, 192.
borealis, xxiii. 179, 190.
carpatica, xxiii. 179, 190.
cordifolia, xxiii. 177, 190.
davurica, xxiii. 178, 190.
β, americana, xxiii. 178, 190.
fontinalis, xxiii. 180, 185, 186, 191.
fruticosa, var. cuneifolia, xxiii. 185, 186, 191.
var. humilis, xxiii. 187, 192.
glandulosa, xxiii. 186, 188–190, 192.
var. rotundifolia, xxiii. 188, 189, 192.
glutinosa, xxiii. 177, 179, 190.
Grayi, xxiii. 188, 192.
gummifera, xxiii. 191.
humilis, xxiii. 189.
japonica, xxiii. 181–183, 191.
kenaica, xxiii. 180–184, 191.
latifolia, xxiii. 182, 183, 191.
var. kamtschatica, xxiii. 182.
" Tauschii, xxiii. 182.
lenta, xxiii. 189.
Littelliana, xxiii. 192.
lutea, xxiii. 189.
mandchurica, xxiii. 182.
Michauxii, xxiii. 187, 191.
microphylla, xxiii. 170, 178, 179, 185, 186, 189, 191.
nana, xxiii. 186, 187, 189, 191.
var. alpestris, xxiii. 192.
" flabellifolia, xxiii. 186.
" Michauxii, xxiii. 186, 187, 191.
" sibirica, xxiii. 192.
× pubescens, xxiii. 189.
× verrucosa, xxiii. 189.
nigra, xxiii. 189.
occidentalis, xxiii. 170, 173–176, 179, 180, 184, 185, 186, 190, 191.
var. commutata, xxiii. 175.
odorata, xxiii. 190, 191.
var. alpigena, xxiii. 190.
" carpatica, xxiii. 179, 191.
" rhombifolia, xxiii. 179, 191.
" tortuosa, xxiii. 178, 190.
papyracea, xxiii. 171, 189, 190.
var. minor, xxiii. 177, 178, 190.
papyrifera, xxiii. 170–176, 179, 183, 184, 190.

Betula papyrifera (*continued*).
var. minor, xxiii. 190.
pendula, xxiii. 169–172, 177, 179, 182–184, 189–192.
var. japonica, xxiii. 179, 183, 184, 189, 191.
populifolia, xxiii. 171, 179, 184, 191.
pubescens, xxiii. 169–173, 177, 190.
ζ, carpatica, xxiii. 179.
var. carpatica, xxiii. 179.
" tortuosa, xxiii. 178, 190.
× humilis, xxiii. 189.
pumila, xxiii. 186–189, 192.
γ, borealis, xxiii. 179, 190.
var. glabrescens, xxiii. 187.
" glandulifera, xxiii. 188, 189, 192.
× lenta, xxiii. 189.
rhombifolia, xxiii. 179, 185, 186, 191.
rotundifolia, xxiii. 188, 192.
tortuosa, xxiii. 178, 190.
verrucosa, xxiii. 169–171, 180, 182, 183, 191.
var. resinifera, xxiii. 180, 181.
Betulaceae, xxiii. 167.
Biddulphia gallapagensis, xxiv. 90.
Bidens, xxiv. 210, 237, 238.
bicolor, xxv. 114.
chilensis, xxiv. 210, 235.
crocata, xvi. 537.
decumbens, xvi. 576.
grandiflora, xxv. 114.
leucantha, ix. 147; xxiv. 210.
mercurialis folia, vi. 327.
pilosa, xxiv. 210, 235.
refracta, xii. 94; xxiv. 210, 235.
tereticaulis, var. **sordida**, xxv. 115.
Bigelowia, x. 43.
brachylepis, xxi. 505.
Nelsonii, xxi. 505.
pyramidata, x. 43.
Bignonia, xvi. 572.
buccinatoria, xvi. 572.
gnaphalantha, xiv. 487.
Bignoniaceae, xxiv. 202, 242.
Birch, Canoe, xxiii. 171, 172, 175–178, 180, 181, 186.
Dwarf, xxiii. 186.
Old Field, xxiii. 171.
Paper, xxiii. 171.
White, xxiii. 171, 172.
Birches, xxiii. 167.
Bladder Campion, v. 133.
Blainvillea, xxiv. 210.
rhomboidea, ix. 146; xxiv. 210, 235.
tenuicaulis, xxiv. 211, 235.
Blechnum, xxiv. 108.
occidentale, ix. 149; xxiv. 108, 224.

Blechnum occidentale (*continued*).
var. caudatum, xxiv. 108, 224.
orientale, xxiv. 108.
Bletia aphylla, xxv. 77.
campanulata, xi. 297.
fulgens, xi. 297.
macristhmochila, xi. 297; xxv. 78.
Boerhaavia, xxiv. 141, 143, 237.
decumbens, xxiv. 141.
diffusa, xxiv. 79, 142.
erecta, xxiv. 141, 228.
glandulosa, xxiv. 142.
hirsuta, ix. 147; xxiv. 142.
paniculata, xxiv. 141, 228.
scandens, xxiv. 141, 228.
viscosa, xxiv. 142, 228.
Boletus lucidus, xxiv. 83.
Boraginaceae, xxiv. 189, 241, 243, 248, 249.
Borraginaceae, xx. 471.
Borreria, ix. 141, 146; xxiv. 204, 206, 249, 255.
basalis, xxiv. 204, 205, 234.
Baurii, ix. 140, 146; xxiv. 204, 234.
dispersa, ix. 146; xxiv. 204, 234.
divaricata, ix. 140, 146; xxiv. 204, 234.
ericaefolia, ix. 146; xxiv. 205, 234.
falcifolia, xxiv. 205, 234.
galapageia, ix. 140, 146; xxiv. 205, 234, 247.
lancifolia, xxiv. 205.
leucomelas, var. filiformis, xxiv. 86.
linearifolia, ix. 146; xxiv. 205, 206, 234.
ovalis, ix. 140; xxiv. 205, 234.
forma, ix. 149.
" **abingdonensis**, xxiv. 205, 234, 243.
pacifica, ix. 140, 146; xxiv. 205, 234.
parvifolia, xxiv. 205, 234.
perpusilla, xxiv. 206, 234.
rotundifolia, xxiv. 206, 234.
sp., xxiv. 206, 234.
suberecta, ix. 146; xxiv. 186, 206, 234.
Borreriae, ix. 138.
Bouchea, xxiv. 196.
sp., ix. 147.
Bouncing Bet, v. 129.
Boussingaultia, xxiv. 141, 237.
baselloides, xxiv. 141, 228.
Bouteloua, xxiv. 117.
pilosa, xxiv. 117, 225.
Bouvardia, xi. 292, 293.
Conzattii, xxv. 92.
longiflora, xi. 292.
Bouvardia (*continued*).
obovata, xi. 304, 305.
Brachistus, i. 171.
diversifolius, xxv. 88.
Pringlei, xxv. 88.
Brachyanthae, xix. 490, 499, 531.
Brachycladia, xxiv. 95.
Brachycome xanthocomoides, ii. 72.
Brandesia echinocephala, xxiv. 137.
Brassica, xxiv. 146.
campestris, xxiv. 146, 228, 238.
Sinapistrum, xxiv. 146, 228, 238.
Bravoa **densiflora**, viii. 122.
Brewerina suffrutescens, vi. 295.
Brickellia, xviii. 337, 338; xxiv. 211.
amblyolepis, xx. 485.
baccharidea, xx. 487.
cardiophylla, xx. 485.
diffusa, xxiv. 211, 235.
floribunda, xx. 486.
glomerata, xxi. 504.
hebecarpa, xx. 486; xxi. 505.
hebecarpoides, xx. 486.
lancifolia, ix. 153.
nutans, ix. 152.
petrophila, xx. 486.
var. **umbratilis**, xx. 487.
squarrosa, iii. 108.
vernicosa, xx. 487.
veronicaefolia, xx. 487.
Bromeliaceae, xxiv. 130, 243.
Bromus carinatus, iv. 123.
Hookeri, var. Schlechtendalii, iv. 123.
Brya amorphoides, vi. 315.
Bryophytes, xxiv. 79.
Bryopsis, xxiv. 89.
pennatula, xxiv. 89.
ramulosa, xxiv. 89.
Bryopteris, xxiv. 100.
filicina, xxiv. 100.
galapagana, xxiv. 100.
tenuicaulis, xxiv. 100.
Buceragenia, xi. 303.
minutiflora, xi. 303.
Bucholtzia filifolia, xxiv. 138.
glaucescens, xxiv. 138.
nudicaulis, xxiv. 139.
Buda, vi. 309.
borealis, vi. 312.
marina, vi. 311.
var. minor, vi. 312.
rubra, vi. 310.
Buddleia **chapalana**, i. 169.
floccosa, ix. 160.
Buellia, xxiv. 84.
flavo-areolata, xxiv. 84.
lactea, xxiv. 85.

Buellia (*continued*).
sp., xxiv. 85.
straminea, xxiv. 84.
Bulbostylis ovata, xv. 494.
Bursera, xxiv. 159.
graveolens, xxiv. 86, 88, 159, 160, 230.
malacophylla, xxiv. 160, 230, 250.
Pringlei, vi. 314.
Burseraceae, xxiv. 159, 243.
Buxus **pubescens**, xiv. 481.
pulchella, xiv. 481.
Byssus sanguinea, xxiv. 85.

Cacabus, xxiv. 202.
Miersii, xxiv. 201.
Cacalia, xi. 311.
amplifolia, xvi. 578.
ampullacea, xvi. 577.
cervariaefolia, iii. 111.
globosa, viii. 119.
longipetiolata, ix. 157.
megaphylla, ix. 157.
obtusiloba, ix. 158.
pachyphylla, ix. 159.
Palmeri, ix. 159.
paucicapitata, ix. 158.
peltata, ix. 158.
var. **Conzattii**, x. 49.
peltigera, iii. 111.
platylepis, iii. 110, 111; xi. 311.
Porophyllum, xxiv. 215.
raduliaefolia, iii. 111.
Schaffneri, iii. 111.
silphiifolia, ix. 158.
suffulta, xi. 310.
tridactylitis, ix. 159.
tussilaginoides, xvi. 578.
Cacosmia, xii. 61.
Cactaceae, xxiv. 79, 178, 241, 243.
Cacti, xxiv. 80.
Caeanopteris rhizophylla, xxiv. 107.
Caesalpinia, ii. 168; xxiv. 148.
Bonducella, ix. 146, 148, 229, 241.
mexicana, var. **pubescens**, vii. 386.
multiflora, ii. 167.
pulcherrima, xxiv. 148, 229.
Calamagrostis pumila, xxiv. 121.
Schiedeana, iv. 122.
Calamintha, xix. 565.
coccinea, xix. 564.
oaxacana, xix. 564.
Calanticaria, xvii. 89.
Calea, x. 20; xvii. 105, 107.
albida, x. 24.
axillaris, x. 27; xvii. 105.
var. **urticaefolia**, x. 27; xvii. 105.
Calea (*continued*).
brachiata, x. 29.
cacosmioides, x. 29.
densiflora, xvii. 105.
discolor, x. 30.
elegans, iv. 120; x. 21, 22.
Grayii, xvii. 106.
hypoleuca, x. 24.
integrifolia, x. 26.
var. dentata, x. 27.
Liebmannii, x. 24.
longipedicellata, x. 28.
manicata, x. 29.
megacephala, x. 21.
multiradiata, iv. 120; x. 22.
Nelsonii, x. 25.
Oliverii, xvii. 106.
orizabensis, x. 29.
Palmeri, x. 21.
peduncularis, x. 23.
var. epapposa, x. 23.
" **livida**, x. 24.
" longifolia, x. 23, 24; xvii. 105.
pellucidinervia, x. 28; xvii. 105.
perforata, xvii. 105.
Pittieri, xvii. 105.
Pringlei, xx. 488.
prunifolia, x. 27; xvii. 105, 106.
rugosa, x. 26.
sabazioides, iv. 120; x. 22.
salmeaefolia, x. 24, 26.
scabrifolia, x. 28; xvi. 529.
sessiliflora, x. 30.
solidaginea, x. 29; xvii. 105.
submembranacea, x. 28.
ternifolia, xvii. 106.
thysanolepis, x. 22.
tomentosa, x. 30; xvii. 106.
trichotoma, x. 28.
urticaefolia, x. 27.
Zacatechichi, 25, 26.
var. **calyculata**, xx. 488.
" **macrophylla**, x. 24–26.
" **rugosa**, x. 26.
Caleacte urticifolia, x. 27.
Calebrachys peduncularis, x. 23.
Callitrichaceae, xxiv. 170.
Callitriche, xxiv. 170, 237.
sp., xxiv. 170, 231.
Callophyllis, xxiv. 93.
furcata, xxiv. 93.
sp., xxiv. 93.
Calochortus flavus, xx. 472.
Pringlei, xx. 472.
Calophanes bilabiatus, xiv. 487.
quadrangularis, xiv. 487.
Calosphace, xix. 491.

Caltha palustris, xxiii. 184.
Calydermos, x. 22.
longifolius, x. 23.
peduncularis, x. 23.
rugosus, x. 26.
salmeaefolius, x. 24.
scaber, x. 23.
var., x. 23.
Calymperes, xxiv. 102.
Sprucei, xxiv. 102.
Calyptrocarya Palmetto, xxiv. 262.
Calystegia, xxiv. 186.
Soldanella, xxiv. 186, 232, 237.
Campanulaceae, xxiv. 208.
Campion, v. 130.
Bladder, v. 133.
Moss, v. 132.
Red, v. 151.
Starry, v. 133.
White, v. 151.
Campylodiscus peramplus, xxiv. 90.
Campyloneurum Phyllitidis, xxiv. 113.
Campylopus, xxiv. 102.
Anderssonii, xxiv. 102.
introflexus, xxiv. 103.
lamellatus, xxiv. 102, 103.
leucotrichus, xxiv. 102.
polytrichoides, xxiv. 102, 103.
sp., xxiv. 102.
Canavalia, xxiv. 148.
obtusifolia, xxiv. 148, 229, 245.
Candicantes, xix. 519.
Canoe Birch, xxiii. 171, 172, 175–178, 180, 181, 186.
Capraria, xxiv. 202.
biflora, ix. 147; xxiv. 202, 234.
var. pilosa, xxiv. 202.
peruviana, xxiv. 202.
Capsicum, xxiv. 199.
annuum, ix. 147; xxiv. 199, 233.
frutescens, xxv. 88.
var. **lanicaule**, xxv. 88.
Carbon, xiii. 321.
Carbonal, xiii. 321.
Cardiospermum, xxiv. 170, 237.
Corindum, ix. 145; x. 38; xxiv. 170. 171, 231, 252.
galapageium, x. 38; xxiv. 171, 231.
integerrimum, x. 38.
molle, xxiv. 170.
Carex, xxii. 447, 495; xxiii. 168, 175.
adusta, xxii. 451, 452, 464, 476, 478, 479, 480, 481.
var. argyrantha, xxii. 478.
" glomerata, xxii. 481.
" minor, xxii. 471.
" sparsiflora, xxii. 480.
aenea, xxii. 461, 462, 464, 480.
Carex (*continued*).
alascana, xxii. 482.
alata, xxii. 448, 450, 451, 463, 476.
var. **ferruginea**, xxii. 463, 477.
albolutescens, xxii. 448, 450, 451, 452, 464, 472.
var. argyrantha, xxii. 478.
" cumulata, xxii. 472.
" glomerata, xxii. 481.
" sparsiflora, xxii. 452, 480.
altocaulis, xxii. 507–509.
approximata, xxii. 494.
aquatilis, xxii. 495–497.
var. cuspidata, xxii. 497.
" elatior, xxii. 496.
" epigejos, xxii. 497.
" sphagnophila, xxii. 497.
" virescens, xxii. 497.
× stricta, xxii. 496.
arcta, xxii. 458, 459, 466, 486.
argyrantha, xxii. 452, 478.
arida, xxii. 467.
atlantica, xxii. 454, 456–458, 485.
aurea, xxiii. 176.
Bastardiana, xxii. 503.
Bebbii, xxii. 449, 462, 478.
Bicknellii, xxii. 450, 451, 463, 475.
Bolanderi, xxii. 490, 491.
var. sparsiflora, xxii. 491.
brizoides, xxii. 487.
bromoides, xxii. 465, 490.
brunnescens, xxii. 453, 458–460, 466, 489.
var. gracilior, xxii. 489.
Buckleyi, xxii. 489.
canescens, xxii. 453, 458, 459, 460, 466, 486, 487, 488, 491.
β, xxii. 489.
var. alpicola, xxii. 459, 489.
" brunnescens, xxii. 489.
" **disjuncta**, xxii. 466, 488.
" dubia, xxii. 459, 487.
" oregana, xxii. 458, 486.
" polystachya, xxii. 458, 486.
" robustina, xxii. 459, 487.
" sphaerostachya, xxii. 489.
" subloliacea, xxii. 459, 466, 488.
" vitilis, xxii. 489.
" vulgaris, xxii. 458, 459, 486, 489.
capillaris, xxii. 509, 510.
var. elongata, xxii. 509.
Carltonia, xxii. 495.
cinerea, xxii. 487.
communis, xxii. 497–505.
var. Wheeleri, xxii. 502–504.

Carex (*continued*).
Crawfordii, xxii. 461, 469.
var. **vigens**, xxii. 462, 470.
cristata, xxii. 450, 462, 469, 472, 473.
var. mirabilis, xxii. 473.
cristatella, xxii. 472.
curta, xxii. 453, 487.
var. brunnescens, xxii. 489.
cyperoides, xxii. 481.
deflexa, xxii. 506.
Deweyana, xxii. 465, 490.
var. sparsiflora, xxii. 491.
dioica, xxii. 482.
echinata, xxii. 447, 453–456, 458, 465, 483. 485, 492.
var. angustata, xxii. 465, 484.
" cephalantha, xxii. 455, 456, 465, 484.
" conferta, xxii. 485.
" **excelsior**, xxii. 465, 484.
" microstachys, xxii. 454, 455.
" **ormantha**, xxii. 465, 483.
elachycarpa, xxii. 467, 492.
elongata, xxii. 487, 453.
Emmonsii, xxii. 498.
exilis, xxii. 453, 460, 465, 482, 495.
var. androgyna, xxii. 482.
" squamacea, xxii. 482.
festiva, xxii. 474.
festucacea, xxii. 450, 451, 464, 475, 477.
var. **brevior**, xxii. 464, 474, 477.
" mirabilis, xxii. 473.
" tenera, xxii. 474.
filiformis, xxii. 503; xxiii. 184.
var. latifolia, xxiii. 176.
foenia, xxii. 449, 451, 452, 462, 464, 472, 478.
var. β, xxii. 450, 451, 477.
" γ, xxii. 476.
" ferruginea, xxii. 451, 477.
" perplexa, xxii. 452, 464, 478, 480.
" sparsiflora, xxii. 480.
" subulonum, xxii. 476.
furva, xxii. 494.
Gebhardii, xxii. 453, 459, 489.
glareosa, xxii. 466, 498.
gynocrates, xxii. 453, 460, 465, 482, 495.
var. monosperma, xxii. 482.
heleonastes, xxii. 459, 467, 494.
helvola, xxii. 492.
interior, xxii. 454, 457, 458, 465, 485, 493.
var. capillacea, xxii. 465, 485.

Carex (*continued*).
Kunzei, xxii. 486.
Lachenalii, xxii. 494.
laeviculmis, xxii. 491.
lagopina, xxii. 466, 487, 494.
lagopodioides, xxii. 468.
var., xxii. 469.
" cristata, xxii. 472.
" mirabilis, xxii. 473.
" moniliformis, xxii. 469.
" scoparia, xxii. 468.
lapponica, xxii. 488.
Leersii, xxii. 483.
leporina, xxii. 449, 462, 464, 468, 479, 494, 495.
var. bracteata, xxii. 472.
Liddoni, xxii. 469, 471.
limosa, xxiii. 176.
var. stygia, xxiii. 176.
lucorum, xxii. 505.
marina, xxii. 495.
mirabilis, xxii. 450, 462, 463, 472, 473.
var. **perlonga**, xxii. 462, 473.
" **tincta**, xxii. 462, 473.
monosperma, xxii. 482.
muricata, xxii. 483.
muskingumensis, xxii. 461, 463, 467.
nigro-marginata, xxii. 506.
norvegica, xxii. 466, 485, 492, 493.
oronensis, xxii. 462, 471.
ovalis, xxii. 479.
pallida, xxii. 469.
parviflora, xxii. 494.
pedicellata, xxii. 499, 503, 504.
var. Wheeleri, xxii. 503, 504.
pennsylvanica, xxii. 500, 504–506; xxiii. 176.
var. **lucorum**, xxii. 505.
" vespertina, xxii. 506; xxiii. 176.
Persoonii, xxii. 489.
pilulifera, xxii. 497–506.
var. Leesii, xxii. 498, 499, 503, 504.
" longibracteata, xxii. 498–500, 502–504.
" pallida, xxii. 498, 500.
pinguis, xxii. 481.
pratensis, xxii. 471.
var. furva, xxii. 452; xxiii. 176.
praticola, xxii. 452, 461, 462, 464, 471; xxiii. 176.
Pseudo-Cyperus, xxiii. 168.
Redowskiana, xxii. 482.
remota, xxii. 490.
Richardi, xxii. 487.
riparia, xxiii. 168.

Carex (*continued*).
rostrata, xxiii. 176.
saltuensis, xxii. 507–509.
saxumbra, xxii. 504.
scirpina, xxii. 458, 485.
scirpoidea, xxii. 457, 458, 485.
scirpoides, xxii. 453–455, 457, 458, 485.
scoparia, xxii. 447–449, 460, 461, 463, 467.
var. condensa, xxii. 461, 468.
" lagopodioides, xxii. 468.
" minor, xxii. 447–449, 470.
" moniliformis, xxii. 449, 461, 468, 469.
" muskingumensis, xxii. 467.
seorsa, xxii. 458, 460, 465, 486, 491.
siccata, xxii. 461, 469.
silicea, xxii. 463, 464, 476.
sparsiflora, xxii. 480.
sphaerostachya, xxii. 489.
stellulata, xxii. 454–456, 483.
γ, xxii. 485.
var. angustata, xxii. 455, 484.
" conferta, xxii. 485.
" scirpina, xxii. 457. 485.
" scirpoides, xxii. 457, 485.
" sterilis, xxii. 485.
sterilis, xxii. 453–458, 465, 483, 484.
β, xxii. 484.
var aequidistans, xxii. 484.
" angustata, xxii. 484.
" cephalantha, xxii. 484.
" excelsior, xxii. 455, 458, 484.
straminea, xxii. 447, 448, 450, 451, 462, 463, 474, 477.
var. alata, xxii. 476.
" aperta, xxii. 451, 475.
" brevior, xxii. 450, 451, 476, 477.
" chlorostachys, xxii. 472.
" Crawei, xxii. 450, 451, 475.
" cristata, xxii. 472.
" cumulata, xxii. 472.
" echinodes, xxii. 463, 474.
" ferruginea, xxii. 451, 477.
" festucacea, xxii. 477.
" foenea, xxii. 472.
" intermedia, xxii. 472.
" invisa, xxii. 475.
" Meadei, xxii. 475.
" minor, xxii. 474.
" mirabilis, xxii. 473.
" moniliformis, xxii. 476.
" Schkuhrii, xxii. 477.
" silicea, xxii. 476.
" tenera, xxii. 474, 475.
Carex, straminea (*continued*).
var. typica, xxii. 477.
sychnocephala, xxii. 464, 481.
tenera, xxii. 448, 450, 451, 463, 474, 475.
var. invisa, xxii. 463, 474, 475.
" major, xxii. 475.
" Richii, xxii. 463, 464, 474–476.
" suberecta, xxii. 477.
tenuiflora, xxii. 466, 486, 491.
tribuloides, xxii. 449, 450, 461, 468.
var. Bebbii, xxii. 478.
" cristata, xxii. 472, 473.
" moniliformis, xxii. 449, 468, 469.
" reducta, xxii. 449, 461, 468, 469, 474.
" turbata, xxii. 461, 469.
trisperma, xxii. 466, 492.
Tuckermani, xxii. 449.
umbellata, xxii. 506, 507.
var. brevirostris, xxii. 507.
" tonsa, xxii. 507.
" vicina, xxii. 506, 507.
vaginata, xxii. 507–509.
var. alto-caulis, xxii. 507, 508.
varia, xxii. 498–500, 503, 504.
var. minor, xxii. 499, 503, 504.
" pedicellata, xxii. 504.
vitilis, xxii. 458, 459, 489.
xerantica, xxii. 462, 464, 479.
Carica, xxiv. 178.
Papaya, xxiv. 178, 232.
Caricaceae, xxiv. 178.
Carlowrightia glandulosa, x. 40.
hapalocarpa, vii. 390.
Pringlei, x. 40.
pubens, x. 40.
Carnation, v. 127.
Carphostelphium, x. 3.
Carpomitra, xxiv. 90.
Cabrerae, xxiv. 90.
Carum Petroselinum, xxiv. 184.
Caryophyllaceae, v. 124; vi. 273, 274; xxiv. 145.
Casimiroa edulis, ii. 166.
Cassia, xxiv. 148.
applanata, xxiv. 149.
Galeottiana, xxv. 80.
hirsuta, xxiv. 148. 229.
longicoma, xxv. 79.
morelensis, xxv. 79.
occidentalis, ix. 146; xxiv. 148, 229.
picta, xxiv. 149, 229.
sericea, xxiv. 149, 229.
Castae, xviii. 325.

Castela, xxiv. 158, 237.
Galapagei, xxiv. 158.
galapageia, ix. 145; xxiv. 158, 159, 230, 245.
forma **albemarlensis**, xxiv. 158, 230.
" **bindloensis**, xxiv. 158, 230.
" **carolensis**, xxiv. 158, 230.
" **duncanensis**, xxiv. 159, 230, 247.
" **jacobensis**, xxiv. 159, 230.
" **jervensis**, xxiv. 159, 230, 249.
galapageja, xxiv. 158.
Nicholsoni, xxiv. 159.
Castilleia **aurea**, x. 39.
gracilis, x. 40.
lithospermoides, i. 173.
var. flava, i. 173.
macrostigma, i. 173.
tenuifolia, x. 40.
Castilleja pallida, var. **angustata**, iii. 114.
Catchfly, v. 130, 134.
Round-leaved, v. 135.
Royal, v. 134.
Sleepy, v. 132.
Snapdragon, v. 132.
Catopsis aloides, xxiv. 263.
Caulerpa, xxiv. 89.
clavifera, xxiv. 89.
racemosa, xxiv. 89.
Celastraceae, xxiv. 170, 243.
Celtis monoica, xiv. 476.
platycaulis, xxv. 78.
Cenchrus, xxiv. 118, 238.
calyculatus, xxiv. 118.
distichophyllus, ix. 148; xxiv. 118, 225, 239.
granularis, ix. 148; xxiv. 118, 225.
platyacanthus, ix. 148; xxiv. 118, 225.
sp., xxiv. 118, 225.
Cenomyce pycnoclada, xxiv. 85.
Centella, xxiv. 184.
asiatica, xxiv. 184, 232.
Centrosema, vi. 315.
Cephalohyptis, xix. 565.
Cerastium, vi. 274, 275, 281.
alpinum, vi. 280.
var. beeringianum, vi. 280.
" Fischerianum, vi. 279.
" glabratum, vi. 280.
apricum, vi. 278.
arvense, vi. 278.
Cerastium, arvense (*continued*).
var. angustifolium, vi. 279.
" fuegianum, vi. 279.
" latifolium, vi. 279.
" maximum, vi. 279, 280
" oblongifolium, vi. 279.
" villosum, vi. 279.
beeringianum, vi. 280.
brachypodum, vi. 277.
var. **compactum**, vi. 278.
bracteatum, vi. 279.
connatum, vi. 277.
dichotomum, vi. 279.
Fischerianum, vi. 280.
fulvum, vi. 277.
glomeratum, vi. 277.
glutinosum, vi. 278.
grande, vi. 276.
hirsutum, vi. 277, 279.
hybridum, vi. 279.
lanatum, vi. 280.
latifolium, vi. 280.
longepedunculatum, vi. 278.
maximum, vi. 276.
nutans, vi. 278.
var. brachypodum, vi. 277.
" compactum, vi. 278.
oblongifolium, vi. 278. 279.
orithales, iv. 117.
pennsylvanicum, vi. 279.
pilosum, vi. 279, 280.
quaternellum, vi. 281.
rigidum, vi. 280.
semidecandrum, vi. 277.
sericeum, vi. 278.
stellarioides, vi. 280.
tenellum, vi. 277.
texanum, vi. 276.
trigynum, vi. 280.
triviale, vi. 277.
velutinum, vi. 279.
villosum, vi. 279.
viscosum, vi. 276, 277.
var. tenellum, vi. 277.
volcanicum, iv. 117.
vulgatum, vi. 277, 280.
var. beeringianum, vi. 280.
" Fischerianum, vi. 280.
" grandiflorum, vi. 280.
" macrocarpum, vi. 280.
" semidecandrum, vi. 277.
Cerastium § Strephodon, vi. 288.
Cerdia, v. 155.
Cereus, xxiv. 178, 179, 180, 236, 237, 245.
galapagensis, xxiv. 179, 180, 232.
multangularis, xxiv. 179.
nesioticus, xxiv. 179, 232.

Cereus (*continued*).
sclerocarpus, xxiv. 179, 180, 232, 246.
Thouarsii, xxiv. 179, 180, 232.
Cestrum **Bourgeauianum**, xix. 572.
elegans, var. **truncatum**, xix. 571.
flavescens, xvi. 572.
fulvescens, xix. 572.
pedunculare, xix. 572.
Regelii, xvi. 572.
Chaetochloa caudata, xxiv. 125.
setosa, xxiv. 125.
Chaetomorpha aerea, xxiv. 90.
antennina, xxiv. 90.
Chamaesaracha **potosina**, ix. 161.
Chamisma, xi. 283.
Cheilanthes, xxiv. 108.
heterotrichus, xxiv. 108.
microphylla, ix. 149; xxiv. 108, 224.
myriophylla, xxiv. 109, 224.
repens, xxiv. 109.
Cheilodiscus, xii. 63, 66.
littoralis, xii. 63.
Chenopodiaceae, xxiv. 134.
Chia, xix. 504.
cimarona, xxi. 500.
Chickweed, vi. 281.
Common, vi. 282.
Common Mouse-ear, vi. 277.
Great, vi. 288.
Mouse-ear, vi. 275, 276.
Chiliophyllum, xvi. 530.
globosum, xvi. 530.
Chiococca, xxiv. 206.
racemosa, xxiv. 206, 234.
trisperma, xxiv. 206.
Chiodecton, xxiv. 85.
sanguineum, xxiv. 85.
Chloris, xxiv. 79, 118, 262.
anisopoda, xxiv. 118, 225.
elegans, xxiv. 119, 225.
paniculata, xxiv. 262.
radiata, ix. 149; xxiv. 119, 225.
sp., ix. 149; xxiv. 119.
Chlorophyceae, xxiv. 89.
Chondrus, xxiv. 94.
canaliculatus, xxiv. 94.
Chrysanthellum, xxiv. 211; xxv. 113.
erectum, xxiv. 211, 235.
indicum, xxv. 114.
mexicanum, xxv. 114.
procumbens, xxv. 114.
pusillum, xxiv. 211, 235.
Chrysodium aureo-nitens, xxiv. 104.
aureum, xxiv. 104.
Chrysophania, xvi. 530.
fastigiata, xvi. 532.
Chrysopsis **Brandegei**, x. 43.
sp., x. 43.
Chthonia, xii. 59–61, 66.
ciliaris, xii. 67.
glaucescens, xii. 59, 67.
leptocephala, xii. 60.
prostrata, xii. 68.
repens, xii. 60.
Chusquea, xxiv. 119.
sp., xxiv. 119, 225.
Circaea alpina, xxiii. 184.
Cissampelos, xxiv. 146, 237.
Pareira, ix. 145; xxiv. 146, 228, 237.
testudinum, xxiv. 146.
Cissus, xxiv. 172.
sicyoides, xxiv. 172, 231.
Citharexylum **Berlandieri**, i. 174.
glabrum, xi. 300.
ovatifolum, xi. 301.
Sessei, xi. 301.
villosum, i. 174.
Citrullus, xxiv. 207.
vulgaris, xxiv. 207, 234.
Cladonia, xxiv. 85.
pycnoclada, xxiv. 85.
rangiferina, var., xxiv. 85.
Clavula ovata, xv. 494.
Cleome aculeata, ii. 165.
diffusa, ii. 165.
potosina, ii. 165.
Clerodendron, xxiv. 194.
molle, ix. 147; xxiv. 194, 233.
sp., xxiv. 195, 233.
Clibadium **anceps**, xxv. 97.
caracasanum, xxv. 98.
fragiferum, xxv. 99.
glomeratum, xxv. 98.
Pittieri, xxv. 98, 99.
surinamense, xxv. 98.
Clitoria, vi. 315.
sericea, vi. 315.
Cnicus altissimus, ii. 179.
excelsior, ii. 179.
imbricatus, ix. 159.
Tolucanus, iii. 111.
Cockle, v. 147.
Corn, v. 152.
Coelestina latifolia, xxiv. 209.
Coldenia, xxiv. 189.
Darwini, xxiv. 189, 233.
Darwinii, ix. 147; xxiv. 189.
fusca, ix. 147; xxiv. 189, 233.
Cologania **Deamii**, xxi. 492.
pulchella, var. **racemosa**, vi. 315
Combretaceae, xxiv. 182.
Commelina, xxiv. 130.
agraria, ix. 148; xxiv. 130.
nudiflora, xxiv. 130, 227.

Commelinacea, xxiv. 131, 227.
Commelinaceae, xxiv. 130.
Common Chickweed, vi. 282.
Common Mouse-ear Chickweed, vi. 277.
Compositae, ii. 177; ix. 151, 156; xvi. 507; xxiv. 208, 241–243, 248, 249, 251; xxv. 69, 93, 106, 113, 115, 117.
Conferva, xxiv. 89.
clathrata, xxiv. 89.
Conocarpus, xxiv. 182.
erectus, xxiv. 182, 232.
Conosilene, v. 131.
Conostegia lasiopoda, xxiv. 263.
Constantinea, xxiv. 98.
Convolvulaceae, xxiv. 186, 241, 243, 248, 251.
Convolvulus **secundiflorus**, xii. 90.
Soldanella, xxiv. 186.
suffulta, ix. 160.
Conyza, xxv. 94.
ambigua, xxiv. 212.
lyrata, xx. 481.
var. **pilosa**, xxi. 506.
Cooperia Drummondi, xiv. 473.
Coptis trifolia, xxiii. 184.
Corallina, xxiv. 94.
Berterii, xxiv. 94.
marginata, xxiv. 95.
Corallorhiza bulbosa, xiv. 474.
involuta, xiv. 474; xxv. 76.
mexicana, xiv. 474, 475.
multiflora, xiv. 475.
Pringlei, xiv. 475.
Corchorus, xxiv. 172.
bullatus, xxiv. 172.
pilobolus, xxiv. 172, 231.
Cordia, xxiv. 189.
alba, ii. 182.
ambigua, i. 169.
Anderssoni, xxiv. 189, 233.
cana, xiv. 483.
dasycephala, xxiv. 191.
galapagensis, xxiv. 190, 233.
Hookériana, xxiv. 190, 233, 245.
incana, xiv. 483.
insularis, xiv. 482, 483.
leucophlyctis, ix. 147; xxiv. 190, 233.
linearis, ix. 147; xxiv. 190.
lutea, ix. 147; xxiv. 190, 233, 245.
n. sp., xxiv. 191, 233.
perlonga, xii. 90.
Pringlei, i. 169; xxv. 86, 87.
revoluta, xxiv. 191, 233.
var. **nigricans**, xxiv. 191, 233.
rotundifolia, xxiv. 190.
scaberrima, ix. 147; xxiv. 190.
Scouleri, ix. 147; xxiv. 191, 243.
Cordia (*continued*).
Seleriana, xxi. 498.
Sonorae, xiv. 483.
sp., ix. 147.
stellata, xxv. 86.
Cordifoliae, xix. 510, 528.
Coreopsideae, xxv. 113.
Coreopsis alata, xvi. 539.
anthemoides, xviii. 314.
ovata, xvi. 539.
petrophila, vii. 388; xviii. 314.
petrophiloides, vii. 388.
rhyacophila, xviii. 313, 314.
trilobata, xvi. 517.
Corion, vi. 309.
[**marinum**] var. **leiospermum**, vi. 311.
Corn Cockle, v. 152.
Coronaria, v. 152.
Flos-cuculi, v. 152.
tomentosa, v. 152.
Coronopus didymus, xxiv. 146.
Corymanthelium, x. 11.
Costatae, xxiii. 189.
Cotton-grass, Red, xv. 199.
Cotyledon gibbiflora, iii. 105.
subrigida, iii. 105.
Coulterophytum, ii. 168.
laxum, ii. 169; vii. 386.
Coursetia **mollis**, vii. 384.
Cranichis **thysanochila**, x. 35.
Crassifoliae, xix. 569.
Crassina, x. 14.
Crossosoma **parviflora**, viii. 114.
Crotalaria, xxiv. 149.
glabrescens, xxiv. 149, 229.
incana, xxiv. 261.
lupulina, xxiv. 149.
puberula, ix. 146; xxiv. 149.
pumila, xxiv. 149, 229.
setifera, xxiv. 149, 229.
Croton, xxiv. 165, 246, 247, 249, 251.
albescens, xxiv. 165.
brevifolius, xxiv. 166.
Ehrenbergii, xvi. 568.
flavens, var., xxiv. 165.
flavescens, xxv. 81.
Gonzalezii, xxv. 81.
incanus, ix. 148; xxiv. 165.
var. microphylla, xxiv. 166.
Macraei, ix. 148; xxiv. 166.
morifolius, xxv. 81.
Palmeri, var. **ovalis**, xxi. 493.
Pringlei, xxv. 81.
Scouleri, ix. 148, 149; xxiv. 165, 230, 245.
forma microphyllus, xxiv. 166, 230.

Croton Scouleri (*continued*).
var. albescens, xxiv. 165, 230.
" brevifolius, xxiv. 166, 230, 247, 251.
" genuinus, xxiv. 165.
" grandifolius, xxiv. 166, 230.
" incanus, xxiv. 165.
" Macraei, xxiv. 166, 230.
Sonorae, xxv. 81.
xalapensis, ix. 148; xxiv. 166.
Cruciferae, xxiv. 146.
Crusea **calcicola**, xi. 305.
coccinea, var. **pubescens**, xi. 306.
coronata, vii. 387.
cruciata, xi. 305.
var. **villosior**, xi. 306.
megalocarpa, ii. 169.
Palmeri, xi. 306.
subulata, vii. 387.
villosa, xi. 306.
Cryptocarpum, xix. 570.
Cryptocarpus, xxiv. 142.
pyriformis, ix. 147; xxiv. 142, 228.
Cryptopetalon, xii. 59–62. 66, 77.
ciliare, xii. 59.
Cryptopetalum, xii. 62, 66.
Cucubalus acaulis, v. 132.
Behen, v. 133.
Douglasii, v. 144.
niveus, v. 133.
polypetalus, v. 134.
stellatus, v. 133.
Cucumis Citrullus, xxiv. 207.
Cucurbita, xxiv. 207.
Citrullus, xxiv. 207.
Melopepo, xxiv. 207.
Pepo, xxiv. 207, 235.
Cucurbitaceae, xxiv. 207, 243.
Cunila **pycnantha**, vii. 391.
tomentosa, xix. 565.
Cuphea, xxiv. 182.
aequipetala, var. **epilosa**, xxv. 83.
avigera, iii. 105.
patula, xxiv. 182, 232.
platycentra, iii. 106.
Reipublicae, iii. 106; xviii. 325.
Cuscuta, xxiv. 186, 238.
acuta, xxiv. 186, 232.
Epithymum, xxv. 85.
gymnocarpa, ix. 147; xxiv. 186, 232.
sandvicensis, var. Mimosae, xxiv. 186.
sandwicensis, xxiv. 186.
sandwichiana, var. Mimosae, xxiv. 186.
Cyaneae, xix. 540.
Cyanophyceae, xxiv. 89.
Cyclanthera biglandulifera, iii. 107.
Pringlei, iii. 106.
Cylindrolepis, x. 11.
Cynaria Carduncellus, xi. 311.
Cyperaceae, xv. 485, 499; xxii. 495; xxiv. 126, 237, 243.
Cyperoideae, xxii. 481.
Cyperus, xxii. 495; xxiv. 126, 129, 237, 251.
aristatus, xxiv. 126, 226.
var. β acaulis, xxiv. 126.
" γ elongatus, xxiv. 126.
biuncialis, xxiv. 127.
brachystachys, ix. 148; xxiv. 126, 226.
confertus, xxiv. 127, 226.
cornutus, xxiv. 128.
dissitiflorus, xxiv. 127.
esculentus, xxiv. 127–129, 226.
fugax, ix. 148; xxiv. 127, 226.
galapagensis, xxiv. 127, 226.
grandifolius, xxiv. 127, 226.
inflexus, xxiv. 126.
laevigatus, xxiv. 127, 226.
ligularis, xxiv. 127, 226.
lutescens, xxiv. 128.
Mutisii, xxiv. 128. 226.
var. plenus, ix. 148; xxiv. 128.
rotundus, xxiv. 128, 226.
rubiginosus, ix. 148; xxiv. 128. 227.
var. **cornutus**. xxiv. 128, 227.
sp., xxiv. 129, 227.
sphacelatus, xxiv. 262.
strigosus, xxiv. 127, 128, 227.
surinamensis, xxiv. 129, 227.
tristachyus, ix. 148; xxiv. 129, 227.
Cystopteris, xxiv. 109.
fragilis, xxiv. 109, 224.
Cytinus **oxylepis**, vi. 321.
Cyttarospermum, xiv. 480; xxi. 496.

Dactyloctenium aegyptiacum, xxiv. 119.
Dahlia **tenuis**, x. 48.
Dalea, viii. 116; xxiv. 150.
filiciformis, vii. 382.
Lumholtzii, viii. 115.
neglecta, vi. 329.
nutans, vi. 329.
parvifolia, ix. 146; xxiv. 150, 229.
tenuicaulis, ix. 146; xxiv. 150, 229.
unifoliata, vii. 383.
Dalembertia, xxi. 494.
Daltonia, xxiv. 103.
robusta, xxiv. 103.
Darea rhizophylla, xxiv. 107.
Darlingtonia virgata, xiii. 332.
Dasya, xxiv. 94.
arbuscula, xxiv. 94.

Dasya (*continued*).
pacifica, xxiv. 94.
Stanfordiana, xxiv. 94.
Dasycephalae, i. 169; xii. 90.
Datura, ix. 142; xxiv. 199.
Metel, xiv. 486.
pruinosa, xiv. 486.
quercifolia, xix. 571.
sp., xxiv. 199. 233.
Tatula, xxiv. 199, 233.
villosa, xix. 571.
Dendrographa, xxiv. 87.
Dentella repens, xii. 93.
Deptford Pink, v. 128.
Descantaria, xxv. 70.
Desmanthodium **lanceolatum**, xvi. 576.
ovatum, xvi. 576.
Desmanthus, xxiv. 150.
depressus, ix. 146; xxiv. 150, 229.
luteus, xiii. 333.
Desmanthus § Neptunia, xiii. 332.
Desmocephalum inelegans, xxiv. 212.
Desmodium, vii. 384; xxiv. 150.
annuum, vii. 385.
Bigelovii, vii. 385.
exiguum, vii. 385.
galapagense, xxiv. 150, 229.
guadalajaranum, xxv. 80.
incanum, ix. 146; xxiv. 150, 229.
jaliscanum, var. **obtusum**, i. 164.
mexicanum, iv. 118.
molle, ix. 146; xxiv. 150, 229.
neo-mexicanum, vii. 385.
var. Bigelovii, vii. 385.
" transversum, vii. 385.
Seatoni, xxv. 80.
spirale, vii. 384, 385; ix. 146; xxiv. 151, 229.
var. annuum, vii. 385.
" Bigelovii, vii. 385.
" exiguum, vii. 385.
" transversum, vii. 384.
subsessile, iv. 118; xxv. 80.
sylvaticum, vii. 384.
tenuiculum, xxiv. 151.
uncinatum, ix. 146; xxiv. 151, 229.
xylopodium, xxv. 80.
Deyeuxia Schiedeana, iv. 122.
Dianthera, x. 41.
candicans, x. 41.
mucronata, xxiv. 203.
Dianthus, v. 125, 127.
alpinus, v. 127.
var. repens, v. 127.
Armeria, v. 128.
armeroides, v. 128.
barbatus, v. 127.
carolinianus, v. 128.
Dianthus (*continued*).
deltoides, v. 127.
prolifer, v. 128.
repens, v. 127.
Diatomeae, xxiv. 90.
Dichodon, vi. 280.
Dichorisandra longifolia, xiv. 471; xxv. 70.
Dichronema, xxiv. 129, 237.
leucocephala, ix. 148; xxiv. 129, 227.
Dicksonia cicutaria, xxiv. 261.
Dicliptera, xxiv. 203.
inequalis, xxv. 90.
nervata, xxv. 90.
peruviana, xxiv. 203, 234.
Pringlei, xi. 302.
resupinata, var. **orbicularis**, iii. 114.
Dicranum Anderssonii, xxiv. 102.
lamellatum, xxiv. 102.
Dictyanthus stapeliaeflorus, ii. 181.
tuberosus, ii. 180.
Dictyocalyx Miersii, xxiv. 201.
Dictyota crenulata, xxiv. 91.
var. canariensis, xxiv. 91.
Digitaria serotina, xxiv. 123.
Dilsea, xxiv. 95.
sp., xxiv. 95.
Diodia, xxiv. 206.
Radula, xxiv. 206, 234.
Dioicae, xxii. 453.
Diploptychia, iii. 105.
Diplothrix, x. 14.
acerosa, x. 14.
juniperifolia, x. 15.
Dioscorea, xviii. 322.
capillaris, ix. 167.
composita, x. 34.
convolvulacea, ix. 167.
Dugesii, vi. 330.
grandifolia, vi. 323.
hirsuticaulis, vi. 324.
lobata, var. **morelosana**, xviii. 323.
macrostachya, xviii. 322.
militaris, vi. 324.
minima, iii. 115.
multinervis, iii. 115.
oaxacensis, xviii. 322.
platycolpota, xx. 471.
plumifera, vi. 324.
Pringlei, vi. 323; xx. 472.
pumicicola, xviii. 322.
remotiflora, vi. 330.
spiculiflora, xviii. 322.
Discaria, xxiv. 171, 237, 245.
pauciflora, ix. 145; xxiv. 171, 231.
sp., ix. 145.
Distichlis sp., xxiv. 125.

Distictis, xiv. 486, 487.
cinerea, xiv. 487.
gnaphalantha, xiv. 487.
laxiflora, xiv. 486, 487.
Dodecatheon Meadia, v. 128.
Dodonaea. xxiv. 171.
viscosa, ix. 145; xxiv. 171, 231.
var. spathulata, xxiv. 171, 231.
Dolichos obtusifolius. xxiv. 148.
Drepanospron, iv. 118.
Drosera rotundifolia, xxiii. 184.
Drymaria, v. 126, 153; xxiv. 145.
anomala, iv. 117.
cordata, v. 153; ix. 145; xxiv. 145, 228.
effusa, v. 154.
Fendleri, v. 153.
filiformis, iv. 117.
glaberrima, ix. 145; xxiv. 145.
glandulosa, v. 153.
holosteoides, v. 153.
sperguloides, v. 153.
tenella, v. 154.
Dubreulia peploides, xxiv. 133.
Duranta, xxiv. 195.
Plumieri, xxiv. 195, 233.
Dwarf Birch, xxiii. 186.
Dyschoriste bilabiatus, xiv. 487.
quadrangularis, xiv. 487.
saltuensis, xii. 92.
Dysodia, xxv. 118.
grandiflora, xviii. 315.
integrifolia, xviii. 315.
Seleri, xviii. 314.
serratifolia, x. 49; xviii. 315.
squamosa, xviii. 315.
Dysodium divaricatum, xx. 463.
radiatum, xx. 463.

Eatonella, xxv. Suppl. leaflet.
Eatonia. xxv. Suppl. leaflet.
Echeandia, xxv. 73.
flexuosa. xxv. 73.
macrocarpa, xxv. 73.
Eclipta, xxiv. 211.
alba, ix. 146; xxiv. 211.
erecta, xxiv. 211, 235.
procumbens, xxiv. 211.
Ehretia cordifolia. vi. 319.
mexicana, vi. 319.
Elaeocharis, xv. 494.
Elaphoglossum aureo-nitens, xxiv. 104.
muscosum, xxiv. 104.
viscosum, xxiv. 105.
Elaphrium graveolens, xxiv. 159.
Tacamaco, xxiv. 159.
Elaterium, xxiv. 208, 237.
cordatum, xxiv. 208, 235.
Eleocharis, xv. 485, 486, 491, 492; xxiii. 176; xxiv. 129, 237.
acicullariformis, xvi. 566.
acicularis, xvi. 567.
carniolica, xv. 497.
diandra, xv. 487, 488–490, 496.
Engelmanni, xv. 488, 490, 491, 495–497.
var. detonsa, xv. 495, 497.
" **robusta**, xv. 496.
fistulosa, xxiv. 129. 227, 238.
intermedia, xv. 486–488, 491, 497.
lanceolata, xv. 493.
Macounii, xv. 497.
monticola, xv. 496.
var. **leviseta**, xv. 496.
mutata, xxiv. 129, 227.
obtusa, xv. 485–497.
β, xv. 495.
var. **gigantea**, xv. 493.
" **jejuna**, xv. 492.
olivacea, xv. 486–488, 491, 494.
ovata, xv. 485, 486, 488–492, 494, 497.
var. Engelmanni, xv. 495, 496.
" gigantea, xv. 493.
" Heuseri, xv. 489, 491, 494.
" humifusa, xv. 489.
palustris, xv. 486–488. 490, 491.
Eleogenus ovatus, xv. 494.
Eleusine, xxiv. 119.
aegyptia, xxiv. 119.
aegyptiaca, ix. 149; xxiv. 119.
aegyptica, ix. 149; xxiv. 119. 226.
indica, ix. 149; xxiv. 120, 226, 241.
Eleutheranthera ovata, xx. 466.
Elisanthe Drummondii, v. 148.
Scouleri, v. 146.
Elongatae. xxii. 453, 458. 386, 491.
Elvira, xxiv. 212.
inelegans, xxiv. 212, 235.
repens, xxiv. 212, 235.
Encelia, x. 45; xvi. 564; xix. 573; xxiv. 212; xxv. 107.
adenophora, xxv. 109. 110.
angustifolia, xxv. 110.
cedrocensis, xvi. 543.
collodes, xxv. 110, 111.
Conzattii, xxv. 111.
glutinosa, ix. 155; xix. 573; xxv. 111.
hispida, iv. 120; xxiv. 212, 235.
hypargyrea, ix. 155.
mexicana, vii. 388; xxv. 110.
var., xxv. 110.
oblonga, viii. 118.
pilosa, xxv. 111.
pleistocephala, xvi. 556.

Encelia (*continued*).
Pringlei, xix. 573; xxv. 111.
rhombifolia. ix. 155.
squarrosa. xxv. 112.
stricta. iv. 120.
tenuis. xii. 94.
Enoconia, x. 45.
Enteromorpha, xxiv. 89
clathrata, xxiv. 89.
Epichroma, x. 39.
Epidendrum, xxiv. 131, 238.
elegans, xiv. 476.
spicatum, xxiv. 131, 227.
Eragrostis, xxiv. 120.
bahiensis, xxiv. 120. 226.
ciliaris, ix. 149; xxiv. 120, 226.
lugens, iv. 123.
major, xxiv. 120, 226.
pilosa, xxiv. 120. 226.
Ereicotis, xi. 290, 291.
Erianthae, viii. 121; xix. 519, 523, 524, 529.
Ericotis, xi. 289, 292.
Erigeron, xxiv. 212; xxv. 94, 95.
adenophorus, xxv. 94.
heteromorphus, ii. 173.
lancifolius. xxiv. 212. 235.
linifolius, xxiv. 212, 235.
repens, xxv. 95.
scaposus. ii. 173.
sp., ix. 146; xxiv. 213, 235.
tenuifolius. ix. 141, 146; xxiv. 212, 213, 235.
Eriocarpha, xvi. 508, 509.
Eriochloa, xxiv. 121.
distachya, xxiv. 121, 226.
Eriocoma, xvi. 508, 509.
arborescens, xvi. 515.
floribunda, xvi. 509.
fragrans, xvi. 510.
grandiflora, xvi. 519.
heterophylla, xvi. 510, 520.
Eriodendron acuminatum. viii. 114.
aesculifolium, vi. 314.
tomentosum, vi. 314; viii. 115.
Eriogonum, v. 155.
Eriophorum, xv. 498.
cyperinum, xv. 498, 499, 501.
var. laxum, xv. 500, 502.
gracile, xxiii. 184.
Eriosema grandiflorum. vi. 316.
multiflorum, vi. 316.
Eryngiophyllum, xxv. 113.
Rosei. xxv. 113.
Eryngium protaeflorum, iv. 119.
Seatoni, iv. 118.
Erysimum macradenium, xiv. 478.
Erythraea divaricata, x. 38.
Erythraea (*continued*).
micrantha, xxv. 83.
retusa, x. 38.
stricta. x. 38.
tetramera. x. 38.
Erythrina, xxiv. 151.
velutina. ix. 146; xxiv. 151, 229.
Esenbeckia flava, viii. 115.
Hartmanii, viii. 115.
Euagave, xi. 296.
Euandrosace, ii. 180.
Euarenaria, vi. 291.
Eucalea, x. 22.
Euechitideae, xi. 298.
Eugymnolomia, xvii. 91.
Euhoustonieae. xi. 283.
Eujusticieae. xi. 303.
Eulychnis, v. 147.
Eumelampodium, xx. 455, 456.
Eumimosa. xiii. 308.
Eunanus. i. 176.
Eupatoriastrum, xxv. 93.
Nelsonii, xxv. 93.
Eupatorium, x. 23; xviii. 329, 337, 338; xxiv. 213; xxv. 93.
abronium, xviii. 339.
adenachaenium, xviii. 329.
adenochaetum, xviii. 329.
adenospermum, xx. 483.
var. pleianthum, xx. 483.
adspersum, xviii. 329.
aegyrophyllum. xviii. 329.
ageratifolium, xx. 478, 484.
var. purpureum, xx. 478.
ageratum. xviii. 334.
albicaule. xviii. 330.
var. **laxius**, xviii. 330.
amblyolepis. xviii. 330.
anisochromum, xviii. 329.
anisipodum, xx. 477. 485.
araliaefolium, xx. 477.
areolare, var. **leiocarpum**, xviii. 330.
badium, xviii. 331.
Benthamii, xviii. 332.
Bertholdii, var. **stenophyllum**, xviii. 331.
Bigelovii, xviii. 338; xx. 477.
brickelloides. xviii. 331.
capnoresbium, xviii. 331, 334, 335; xx. 480.
cardiophyllum, xviii. 331.
chapalense, var. **salicifolium**, xviii. 332.
chiapense, xviii. 332.
chrysocephalum, xviii. 341.
collodes, ix. 152.
conspicuum, xx. 477.
Conzattii, xvi. 574.

Eupatorium (*continued*).
Coulteri, xx. 477.
crassirameum, xviii. 332.
crenaeum, xviii. 333.
daleoides, xx. 483.
dasycarpum, xx. 478.
desquamans, xviii. 333.
Donnell-Smithii, xviii. 332.
drepanophyllum, xviii. 330.
dryophilum, xx. 478.
Ecuadorae, xviii. 341.
Ehrenbergii, xviii. 332, 335.
eriocarpum, x. 42.
Espinosarum, var. ambiguum, i. 165.
var. **subintegrifolium**, i. 165.
euonymifolium, xi. 308; xx. 479.
filicaule, ii. 170; xx. 480; xxiv. 213, 235.
glaucum, xviii. 331, 333–335.
Gonzalezii, xx. 479.
grandifolium, xx. 477.
guadalupense, xviii. 340.
heterolepis, xviii. 335; xx. 477.
Heydeanum, xviii. 335.
hirsutum, xx. 480.
hyssopinum, xi. 308; xx. 478.
ixiocladon, xx. 484.
koelliaefolium, xi. 308; xx. 478.
lanicaule, xviii. 336.
Lemmoni, ii. 171; xi. 308; xx. 479.
leonense, xx. 479.
leptodictyon, xvi. 574, 575.
Liebmannii, xx. 480.
ligustrinum, xviii. 334.
Loesenerii, xviii. 336, 341.
longifolium, xx. 480.
lucidum, xx. 480.
Luxii, xx. 480.
lyratum, xx. 481.
madrense, xx. 477.
Mariarum, xx. 481.
micranthum, xviii. 331, 334.
myrianthum, xviii. 341.
Nelsonii, xviii. 337.
occidentale, xx. 484.
Oerstedianum, xviii. 337.
oreithales, xi. 308.
oresbium, xviii. 337.
Orizabae, xviii. 334, 335.
pacacanum, xviii. 338.
pachypodum, xx. 481.
Palmeri, ii. 170; xx. 480.
pansamalense, xx. 482.
papantlense, xviii. 330.
parviflorum, x. 13.
pazcuarense, xx. 481.
phoenicolepis, xviii. 338.
photinum, xviii. 338.
Eupatorium (*continued*).
pinabetense, xx. 482.
platyphyllum, xviii. 339.
pleianthum, xx. 478, 483.
plucheoides, xviii. 336.
polanthum, xviii. 329.
popocatapetlense, xviii. 334.
Pringlei, ix. 152.
prionobium, xx. 483.
prionophyllum, xx. 484.
pycnocephalum, xx. 477, 485.
quadrangulare, xx. 484.
Rafaelense, ix. 152.
roseum, xviii. 338.
Rothrockii, ii. 172.
rubrocaule, xviii. 329.
rupicola, x. 42.
Saltivarii, iii. 108; xi. 308; xviii. 339.
scabrellum, xviii. 339.
scandens, x. 13.
Schaffneri, ii. 171.
scordonioides, xx. 482.
scorodonioides, var. **grossedentatum**, xviii. 340.
Selerianum, xviii. 340.
semialatum, xviii. 334.
Smithii, xviii. 340, 341.
sordidum, xviii. 336.
sp., xxiv. 213, 235.
strictum, xvi. 575.
subpenninervium, xviii. 330.
tepicanum, xvi. 574; xx. 483.
Thieleanum, xviii. 341.
thyrsoideum, xx. 484.
triangulatum, xviii. 329.
tubiflorum, xviii. 330.
Tuerckheimii, xx. 481, 482.
tulanum, xviii. 325.
Valverdeanum, xviii. 341.
vanillosmoides, xvi. 574.
vernonioides, xviii. 337.
viscidipes, xx. 484.
Vitalbae, xviii. 341.
Eupectideae, xii. 61.
Eupectis, xii. 63–66.
Euphorbia, ix. 138; xxi. 494; xxiv. 166.
adenoptera, iv. 121.
amplexicaulis, ix. 138, 149; xxiv. 166, 230.
apiculata, xxiv. 166, 230.
articulata, ix. 139, 148; xxiv. 166–169, 230.
astroites, xxi. 496.
brasiliensis, xxi. 495.
calcicola, xxi. 496.
Cumbrae, xxv. 83.
cuphosperma, vii. 392.

Euphorbia (*continued*).
delicatula, vii. 391.
dictyosperma, xvi. 568.
diffusa, ix. 148; xxiv. 167, 230.
Fendleri, iv. 121.
flabellaris, ix. 144, 148; xxiv. 167, 230.
Francoana, vii. 392.
galapageia, ix. 144, 148; xxiv. 167, 230.
heterophylla, vii. 392; xiv. 479.
hypericifolia, xxi. 495.
interaxillaris, xxi. 495.
jaliscensis, vii. 392.
lacera, xiv. 478, 479.
lancifolia, xxi. 496.
var. villicaulis, xxi. 496.
leucocéphala, x. 37.
lineata, xxi. 494.
Luciismithii, x. 36.
macrocarpa, ix. 164.
macropodoides, ix. 164.
maculata, xxiv. 167.
muscicola, xxi. 495.
nesiotica, xxiv. 167, 230, 250.
nummularia, ix. 148; xxiv. 168, 230.
var. glabra, ix. 144, 148; xxiv. 168, 231.
oaxacana, x. 37.
pilosella, iv. 121.
pilulifera, xxi. 494; xxiv. 168, 231, 241.
potosina, xxi. 495.
Preslii, xxi. 495; xxv. 83.
prostrata, xiv. 479.
puberula, xxi. 494.
punctulata, ix. 148; xxiv. 168, 231.
ramosa, iv. 121; xiv. 479.
var. villosior, xi. 297; xiv. 479.
recurva, xxiv. 168, 231.
restiacea, xiv. 481.
rubida, xxv. 83.
sp., xxiv. 169, 231.
stictospora, xxi. 495.
subcaerulea, x. 37.
tricolor, xiv. 479.
villifera, iv. 121.
viminea, ix. 136, 138, 139, 148, 149; xxiv. 158, 168, 169, 176, 231, 255–258.
forma albemarlensis, ix. 138, 139; xxiv. 168.
" barringtonensis, ix. 139; xxiv. 168, 231.
" carolensis, ix. 139; xxiv. 168, 231.
" castellana, ix. 138; xxiv. 168, 231, 251.
Euphorbia, viminea (*continued*).
forma chathamensis, ix. 138; xxiv. 168, 231.
" jacobensis, ix. 138; xxiv. 169, 231.
" jervensis, ix. 139; xxiv. 169, 231, 249.
var. abingdonensis, ix. 139; xxiv. 169, 231, 243.
violacea, xiv. 480.
xylopoda, xiv. 480.
Euphorbiaceae, xxi. 493; xxiv. 161, 241, 243, 245, 248, 251.
Euphrasioides, ix. 169.
Euphyllanthus, vii. 393.
Eurachne publiflora, iv. 122.
Eustellaria, vi. 282.
Eutoca, viii. 120; xxv. 85.
Eutradescantia, xxv. 71.
Eutriana pilosa, ix. 149; xxiv. 117.
Eutridax, x. 4, 10.
Euxolus sclerantoides, xxiv. 135.
Evening Lychnis, v. 151.
Evernia flavicans, var. crocea, xxiv. 88.
Evolvulus, xxiv. 186.
alsinoides, var., xxiv. 79.
commelinifolius, xii. 89.
discolor, xii. 89.
glaber, xxiv. 186, 232.
glabriusculus, ix. 147; xxiv. 186.
hirsutus, xxiv. 186.
holosericeus, vi. 320; xii. 89.
mucronatus, xxiv. 186.
nummularius, xxi. 498.
ovatus, xii. 89.
prostratus, vi. 320.
Selerianus, xxi. 498.
simplex, ix. 147; xxiv. 187, 232, 237.

Fagara lenticifolia, xxiv. 158.
Pterota, xxiv. 158.
Favolus, xxiv. 82, 83.
ciliaris, xxiv. 82.
Ferdinanda, xvi. 530, 531.
angusta, xvi. 532.
var. megacephala, xvi. 533.
lutescens, xvi. 532.
montagnaefolia, xvi. 533.
oppostifolia, x. 28.
Festuca aequipetala, iv. 123.
ovina, iv. 123.
rubra, iv. 123.
var. pauciflora, iv. 123.
tolucensis, iv. 123.
Willdenoviana, iv. 123.
Ficus jaliscana, viii. 122.
Filices, xxiv. 104, 243.

Fimbristylis, xxiv. 129, 237.
alamosana, xxi. 491.
autumnalis, xxi. 492.
capillaris, xxiv. 129, 227.
diphylla, xxiv. 129, 227.
Holwayana, xxi. 492.
laxa, xxi. 492.
melanospora, xxi. 491.
obscura, xxi. 492.
pentastachya, xxi. 492.
polymorpha, xxi. 491.
Fire Pink, v. 134.
Flaveria, xxiv. 213.
anomala, ii. 178.
Contrayerba, xxiv. 213, 235.
linearis, ii. 178.
repanda, ii. 178.
vaginata, x. 48.
Fleurya, xxiv. 132.
aestuans, xxiv. 132, 227.
var. tuberculata, ix. 148; xxiv. 132.
cordata, xxiv. 132.
Florestina, x. 49.
pedata, x. 48.
platyphylla, x. 49.
Fomes, xxiv. 83.
lucidus, xxiv. 83.
Forestiera, x. 36.
Franseria **nivea**, viii. 117.
Froelichia, xxiv. 136.
juncea, ix. 143, 148; xxiv. 136, 228.
lanata, xxiv. 136.
lanigera, xxiv. 136, 137, 228.
nudicaulis, ix. 143; xxiv. 136, 228.
scoparia, xxiv. 136, 228.
Frullania, xxiv. 100.
aculeata, xxiv. 100.
atrata, ix. 149; xxiv. 100.
galapagona, xxiv. 100.
tamarisci, xxiv. 100.
vaginata, xxiv. 100.
Fruticosi, xxv. 119.
Fuchsia minutiflora, iii. 106.
mixta, iii. 106.
Pringlei, iii. 106.
Fucodium, xxiv. 90.
galapagense, xxiv. 90.
Fucus Cabrera, xxiv. 90.
coccineus, xxiv. 99.
crinalis, xxiv. 95.
graminifolius, xxiv. 92.
racemosus, xxiv. 89.
vermicularis, xxiv. 96.
Fulgentes, xix. 529, 533, 546.
Fungi, xxiv. 79, 82.
Furcraea, xiv. 474.
Bedinghausii, xiv. 474.
Galactea, xxiv. 151, 237.
Jussiaeana, var. glabrescens, xxiv. 152, 229.
var. volubilis, xxiv. 151, 229.
multiflora, vi. 315.
n. sp., xxiv. 152, 229.
velutina, xxiv. 151.
Galapagoa, ix. 147.
Darwini, xxiv. 189.
fusca, xxiv. 189.
Galaxaura, xxiv. 95.
marginata, xxiv. 95.
Galinsoga, vi. 325; x. 10; xviii. 316.
brachystephana, vi. 326, 327.
calva, xviii. 317, 318.
hispida, vi. 326, 327.
parviflora, vi. 325–327.
var. caracasana, vi. 325–327.
" hispida, vi. 326, 327.
" semicalva, vi. 325, 327.
trilobata, x. 5.
Galinsogea, x. 3.
balbisioides, x. 5.
brachiata, x. 29.
Galinsogeae, ii. 177.
Galium, xiv. 455, 456, 468.
acutissimum, xiv. 463.
angulosum, xiv. 455, 466.
Aparine, xiv. 457.
var. Vaillantii, xiv. 457.
Aschenbornii, xiv. 466, 470.
asperrimum, xiv. 457.
Brandegei, xiv. 465.
californicum, var. texanum, xiv. 460.
canescens, xiv. 461.
ciliatum, xiv. 469.
Claytoni, xiv. 465.
denticulatum, xiv. 467.
Fendleri, xiv. 462.
fuscum, xiv. 464.
Galeottianum, xiv. 465.
geminiflorum, xiv. 466.
glaberrimum, xiv. 465.
hirsutum, xiv. 469.
hypadenium, xiv. 464.
hystricocarpum, xiv. 464.
involueratum, xiv. 469.
jalapense, xiv. 459.
laevigatum, xiv. 468.
leucotrichum, xiv. 464.
mexicanum, xi. 306; xiv. 457.
var. **glabratum**, xiv. 458.
" **platyphyllum**, xiv. 458.
microphyllum, xiv. 469.
Nelsonii, xiv. 460.
obstipum, xiv. 459.
oresbium, xiv. 462.

Galium (*continued*).
orizabense, xiv. 459.
praetermissum, xi. 306; xiv. 458.
Pringlei, xiv. 458.
proliferum, xiv. 461.
var. **subnudum**, xiv. 461.
pubens, xiv. 467.
Rothrockii, xiv. 462, 463.
Seatonii, xiv. 460.
stellatum, xiv. 463.
texanum, xiv. 462.
texense, xiv. 460, 462.
trifidum, var. subbiflorum, xiv. 465.
triflorum, xiv. 456; xviii. 313.
uncinulatum, xiv. 459, 460.
var. **nanum**, xiv. 459.
" obstipum, xiv. 459, 461, 464, 465.
uropetalum, xiv. 460, 466.
verum, xiv. 456.
virgatum, xiv. 461.
var. diffusum, xiv. 461.
" leiocarpum, xiv. 462.
Wrightii, xiv. 463.
var. **latifolium**, viii. 116; xiv. 462, 463.
Galium § Relbunium, xiv. 468.
Gardoquia mexicana, xix. 565.
Geissolepis, ii. 177.
suaedaefolia, ii. 177.
Gelidium, xxiv. 95.
corneum, var. **crinale**, xxiv. 95.
crinale, xxiv. 95.
filicinum, xxiv. 95, 96.
serrulatum, xxiv. 95, 96, 98.
Genipa, xii. 93.
cinera, xii. 93.
Gentiana Wrightii, iii. 113.
Geoffraea, xxiv. 152.
superba, xxiv. 152, 229, 248.
Geoffroya, xxiv. 152.
Geraea, ix. 155.
Gerardia dasyantha, ii. 183.
punctata, i. 172; ii. 183.
sp., ix. 174.
Gesnera sp., ix. 174.
Gigartina, xxiv. 96.
Lessonii, xxiv. 96.
melanothrix, xxiv. 96.
Githago, v. 152.
segetum, v. 153.
Gleichenia, xxiv. 109.
dichotoma, xxiv. 109, 224.
Glossopetalon nevadense, viii. 114.
Glossophora, xxiv. 90, 91.
galapagensis, xxiv. 90.
Kunthii, xxiv. 91.
Glyphosperma Palmeri, xxi. 492.
Gnaphalium **Altamiranum**, xxv. 95.
chartaceum, xxv. 95.
crenatum, xxv. 96.
decurrens, xxv. 95.
var., xxv. 95.
gracile, xxv. 96.
jaliscense, xxv. 96.
leptophyllum, xi. 308.
Liebmanni, iv. 119.
linearifolium, xi. 308.
oaxacanum, xxv. 96.
oblanceolatum, xxv. 97.
pannosum, xxv. 97.
Popocatepecianum, iv. 119.
purpureum, xxv. 97.
var. **macrophyllum**, xxv. 97.
semiamplexicaule, xxv. 96.
stramineum, xxv. 96.
Wrightii, xxv. 95.
Gochnatia **Smithii**, x. 50.
Goniophlebium loriceum, xxiv. 112.
Gonolobeae, ix. 159.
Gonolobus **angustilobus**, vii. 388.
barbatus, vi. 319.
bifidus, xvi. 570.
caudatus, var. **trachyanthus**, xiv. 482.
chrysanthus, xi. 299.
diadematus, vii. 389.
jaliscensis, vii. 389.
parviflorus, var **brevicoronatus**, i. 169.
Schaffneri, xvi. 570.
sororius, vi. 318.
suberiferus, ii. 181.
Gonolobus § Chthamalia, xvi. 570.
Gonzalea glabra, xi. 301.
Goodeniaceae, xxiv. 208.
Gossypium, xxiv. 173.
barbadense, xxiv. 173, 174, 231.
Klotzschianum, ix. 145; xxiv. 174, 231.
purpurascens, xxiv. 173.
Gracilaria, xxiv. 96.
rugulosa, xxiv. 96.
Gramineae, xxiv. 116, 243.
Great-chickweed, vi. 288.
Greniera Douglasii, vi. 300.
tenella, vi. 301.
Grindelia **glandulosa**, xvi. 575.
squarrosa, var. **hirtella**, ix. 153.
Guaiacum, xxiv. 159.
Guapeba, xii. 88.
Guardiola, platyphylla, vi. 317.
rotundifolia, vi. 317.
Gymnogongrus, xxiv. 96.
Griffithsiae, var. galapagensis, xxiv. 96.

Gymnogongrus (*continued*).
melanothrix, xxiv. 96.
vermicularis, xxiv. 96.
Gymnogramma, xxiv. 109.
Gymnogramme, xxiv. 109.
calomelanos, ix. 149; xxiv. 109, 261.
chaerophylla, xxiv. 109, 224.
dealbata, xxiv. 109.
leptophylla, ix. 149; xxiv. 109, 224.
tartarea, xxiv. 109, 224.
Gymnolomia, xvi. 532; xvii. 87–89.
annua, xvii. 93.
calva, xvii. 103.
var. lancifolia, xvii. 103.
canescens, ii. 174; xvii. 96.
cinerascens, xvii. 90.
connata, xvii. 103.
costaricensis, xvii. 95, 104.
cruciata, xvii. 97.
decumbens, i. 165; xvii. 88, 101.
decurrens, xvii. 102, 104.
Ehrenbergiana, xvii. 94, 104.
ensifolia, xvi. 521; xvii. 88, 100.
flava, xvii. 101, 102.
Ghiesbreghtii, xvii. 88, 101.
Goebelii, xvii. 98.
Greggii, xvii. 89.
hirsuta, xvii. 98.
hispida, xvii. 93.
var. ciliata, xvii. 93.
hondensis, xvii. 97.
Kunthiana, xvii. 98.
latibracteata, xvii. 100.
Liebmannii, xvii. 96.
longifolia, xvii. 92.
megacephala, xvii. 102.
var. simulans, xvii. 88, 102.
microcephala, xvii. 103; xxv. 100.
var. abbreviata, xxv. 100.
" brachypoda, xxv. 101.
" guatemalensis, xxv. 101.
" macrophylla, xxv. 101.
multiflora, i. 165; xvii. 87, 91–93.
var. annua, xvii. 93.
ovata, xvii. 96.
Parkinsonii, xvii. 98, 104.
forma flaviflora, xvii. 99.
patens, xvi. 521; xvii. 94, 95, 104; xxv. 100.
var. abbreviata, vii. 387; xvii. 94; xxv. 100.
" brachypoda, xvii. 95; xxv. 101.
" guatemalensis, xvii. 94; xxv. 101.
" macrophylla, xvii. 95; xxv. 101.
pinnatilobata, xvii. 90.
Gymnolomia (*continued*).
Pittieri, xxv. 101.
platylepis, xvii. 102, 104; xxv. 101.
Porteri, xvii. 91.
quitensis, xvii. 98.
rudbeckioides, xvii. 95.
rudis, i. 165; xvii. 99, 104.
var. minor, vii. 387; xvii. 99.
sericea, xvii. 100.
serrata, xvii. 99.
silvatica, xvii. 104.
squarrosa, xvii. 99.
subflexuosa, xvii. 87, 95.
tenella, xvii. 97.
tenuifolia, xvii. 90.
triloba, xvi. 531; xvii. 104.
tripartita, ix. 154; xvii. 89, 90.
triplinervia, xvii. 97, 104.
Gymnopsis, xvii. 87, 89.
costaricensis, xvii. 95.
Kunthiana, xvii. 98.
verbesinoides, xvii. 104.
vulcanica, xvii. 95, 104.
Gymnothrix paupera, xxiv. 124.
Gypsophila, v. 125, 128, 129.
muralis, v. 129.
paniculata, v. 129.
Habbasia, xiii. 315; xx. 474.
Habenaria clypeata, x. 34.
flexuosa, x. 34.
jaliscana, xxv. 76.
leucaecapensis, xxv. 76.
macroceratites, ii. 184.
oreophila, xxv. 76.
Pringlei, ii. 184.
setifera, ii. 184.
subauriculata, x. 34.
Habracanthus, xi. 303.
Habrothamnus, xix. 572.
Halenia crassiuscula, iii. 113, 115.
Pringlei, iii. 113.
Halianthus, vi. 291.
Halorrhagidaceae, xxiv. 183.
Hamelia nodosa, xi. 305.
Hamulium, xvi. 534–537.
alatum, xvi. 537.
Wrightii, xvi. 537.
Haplopappus, xxiv. 209.
Hastatae, xix. 552.
Hebeclinium, xviii. 336.
Hechtia gamopetala, xviii. 323.
Pringlei, ix. 167.
rosea, xviii. 323.
sphaeroblasta, xviii. 323.
stenopetala, xviii. 323.
Hedyotis acerosa, xi. 291.
asperuloides, xi. 289.

Hedyotis (*continued*).
bouvardioides, xi. 292.
humifusa, xi. 287, 288.
mucronata, xi. 292.
serpyllacea, xi. 284.
stenophylla, xi. 285.
var. parviflora, xi. 286.
Hedysarum spirale, vii. 384.
Helenoideae, xxv. 115.
Heleocharis, xv. 485, 492, 494.
obtusa, xv. 494.
Helianthella quinquenervis, var. arizonica, xxv. 112.
Helianthoideae, xxiv. 242.
Helianthus, xxv. 104, 108.
aristatus, xvi. 542.
oaxacanus, xxv. 107.
petiolaris, xxv. 107.
var. canescens, xxv. 107, 108.
tetrapterus, xvi. 539.
Heliomeris, xvii. 89.
multiflora, xvii. 92, 93.
var. hispida, xvii. 93, 94.
tenuifolia, xvii. 91.
Heliophytum indicum, xxiv. 192.
parviflorum, xxiv. 192.
Heliopsis, xvii. 104.
Helioreos, xii. 61, 66, 72, 73.
Heliotropium, xxiv. 192.
Anderssonii, xxiv. 192, 233.
asperrimum, xxiv. 192.
axillare, xiv. 483.
Curassavicum, ix. 147; xxiv. 192, 233, 237.
fruticosum, xiv. 485.
indicum, xxiv. 192, 233.
limbatum, i. 170.
mexicanum, xiv. 484.
oaxacanum, xiv. 485.
parviflorum, ix. 147; xxiv. 192, 233.
phyllostachyum, i. 170.
Pringlei, i. 170; xiv. 484.
rugosum, xiv. 485.
Helopus brachystachys, xxiv. 121.
Helosciadium laciniatum, xxiv. 184.
leptophyllum, xxiv. 184.
Hemicarpha, xxiv. 130, 237.
micrantha, xxiv. 130.
subsquarrosa, ix. 148; xxiv. 130, 227.
Hemidesmas, xiii. 332.
Hemionitis pinnata, xxiv. 104.
Hemispadon, ix. 171.
Hemizonia, xxiv. 213.
squalida, xxiv. 213, 235.
Hepaticae, xxiv. 79, 100.
Herpestis **auriculata**, i. 172.
decumbens, xii. 91.
sessiliflora, xii. 92.
Herpophyllon, xxiv. 97.
coalescens, xxiv. 97.
Heterogyne, x. 14.
Heteroloma, iv. 118.
Heteropectis, xii. 62–65, 84.
Heterosphace, xix. 553.
Heterotoma **Goldmanii**, xxi. 504.
macrocentron, xxi. 504.
stenodonta, xxi. 504.
Hexalectris aphylla, xxv. 77.
aphyllus, xxv. 77.
mexicana, xxv. 77.
Hibiscus, xxiv. 174.
tiliaceus, xxiv. 174, 231, 241, 263.
Hidalgoa ternata, xx. 466.
Hieracium, xii. 57.
Hierochloë borealis, xxiii. 184.
Hippomane, xxiv. 169.
Mancinella, xxiv. 169, 231.
Hippomaneae, xxi. 493.
Holosteum, vi. 274, 275.
succulentum, vi. 282.
umbellatum, vi. 275.
Honkenya, vi. 291.
oblongifolia, vi. 291.
peploides, vi. 291.
var. oblongifolia, vi. 291.
Hosackia gracilis, xviii. 309.
oaxacana, xviii. 309.
repens, xviii. 308, 309.
Torreyi, xviii. 309.
Houstonia, xi. 283.
acerosa, xi. 290.
angustifolia, xi. 285.
var. **filifolia**, xi. 285.
" **rigidiuscula**, xi. 285, 286.
" **scabra**, xi. 286.
arenaria, xi. 289.
asperuloides, xi. 289.
bouvardioides, xi. 292.
Brandegeana, xi. 288, 289.
brevipes, xi. 290.
caerulea, xi. 284.
Croftiae, xi. 284.
fasciculata, xi. 286, 291.
fruticosa, xi. 292.
humifusa, xi. 287, 288.
longiflora, xi. 292.
longipes, xi. 290.
Palmeri, xi. 289.
parviflora, xi. 284.
polypremoides, xi. 291.
var. **Bigelovii**, xi. 291.
purpurea, xi. 285.
var. tenuifolia, x. 42.
rubra, xi. 287.
rupicola, xi. 286.
salina, xi. 286.

Houstonia (*continued*).
serpyllacea, xi. 284.
subviscosa, xi. 288.
triflora, xi. 293.
Wrightii, xi. 287.
Humulus Lupulus, xix. 543.
Hybridella, xvi. 530.
Hydrocotyle, xxiv. 184.
asiatica, xxiv. 184.
galapagensis, xxiv. 184, 232.
repanda, xxiv. 184.
umbellata, ix. 140, 146; xxiv. 184.
Hymenatherum, xxv. 118.
Hymenocallis galvestonensis, xxv. 74.
graminifolia, xxv. 74.
humilis, xxv. 74.
Pringlei, xxv. 74.
Hymenophyllum, xxiv. 241.
Hyparrhenae, xxii. 447, 453, 458, 460.
Hypenea § Laxiflorae, xix. 566.
Hypericifoliae, xxv. 83.
Hypnea, xxiv. 96, 98.
pannosa, xxiv. 98.
Hypnum nigricans, xxiv. 103.
Hypochnus rubrocinctus, xxiv. 85.
Hypolepis, xxiv. 109.
repens, xxiv. 109, 224.
Hypolytrum, xxiv. 262.
Hypoxis, xxiv. 131.
decumbens, xxiv. 131, 227.
erecta, ix. 148; xxiv. 131.
Hyptis, xxiv. 197.
axillaris, xix. 565.
capitata, xxiv. 197, 233.
crenata, xvi. 521.
glandulosa, xix. 492.
madrensis, xix. 565.
Nelsonii, xix. 566.
nitida, xix. 498.
Parkeri, xix. 565.
Pringlei, xix. 565.
spicigera, ix. 147; xxiv. 197.
subverticillata, xxiv. 197, 233.
verticillaris, xix. 565.

Ilex rubra, viii. 115.
Illecebrum frutescens, xxiv. 138.
Imbricatae, x. 11.
Inflatae, xix. 532.
Inga guatemalensis, xiii. 315.
Inula aestuans, xvi. 564.
saturejaoides, xii. 82.
saturejoides, xii. 82.
Satureiae, xii. 82.
Iostephane heterophylla, iv. 119.
Ipomoea, xxiv. 79. 187, 188, 237.
acuminata, ix. 147; xxiv. 188.
ampullacea, xii. 89.

Ipomoea (*continued*).
barbatisepala, xxv. 84.
biloba, xxiv. 187, 232, 237, 241.
Bona-nox, xxiv. 187, 232, 241.
bracteata, var. **pubescens**, ix. 160.
campanulata, xxiv. 187, 232, 238.
caudata, xxi. 498.
digitata, i. 171.
dimorphophylla, xiv. 482.
filipes, xii. 90.
galapagensis, xxiv. 187, 232.
Habeliana, xxiv. 188, 232, 237.
Kinbergi, ix. 147; xxiv. 188, 232, 251.
leonensis, i. 170.
linearifolia, xxiv. 188, 232.
maritima, xxiv. 187.
Nil, xxiv. 188, 232.
nymphaeifolia, xvi. 570.
ornithopoda, ii. 183; xxv. 84.
Palmeri, var. **platyphylla**, xii. 90.
pentaphylla, ix. 147; xxiv. 188, 232.
perlonga, vi. 319.
Pes-caprae, xxiv. 187.
simulans, xxi. 498.
sp., xxiv. 188.
stans, var. **hirsuta**, vi. 319.
suffulta, ix. 160.
tentaculifera, xiv. 482.
tubiflora, xxiv. 189, 233.
Iresine, xxiv. 137.
discolor, xiv. 477.
Edmonstonei, xxiv. 137, 228.
Iridaea, xxiv. 94.
Isochilus lineare, vi. 323.
unilaterale, vi. 323.
Isostigma, xxv. 113.

Jacobaea humifusa, Hypericifolius, xii. 58.
Jacobinia, x. 41.
candicans, x. 41.
mexicana, x. 41.
mollis, xxv. 91.
oaxacana, xxv. 91.
stellata, vii. 390.
Jacquemontia **Smithii**, ix. 160.
violacea, ix. 160.
Jaegeria, xviii. 315, 316, 318, 319; xxiv. 213.
bellidioides, xviii. 319.
calva, xviii. 317, 318.
discoidea, xviii. 318.
gracilis, xviii. 319; xxiv. 213, 235.
hirta, xviii. 316–318; xx. 465.
var. glabra, xviii. 316, 318.
macrocephala, xviii. 317.
mnioides, xviii. 317.

Jaegeria (*continued*).
pedunculata, xviii. 317.
petiolaris, xviii. 316.
prorepens, xviii. 316, 318; xxiv. 213, 235.
purpurascens, xviii. 316.
repens, xviii. 317.
Jatropha Pseudo-Curcas, xxv. 82.
Jaumea, xxv. 115.
Junci, xxiii. 168.
Juncus, xxiii. 176.
effusus, xxiii. 184.
tenuis, xxiii. 168.
Jungermannia filicina, xxiv. 100.
var. tenuis, xxiv. 100.
pungens, xxiv. 100.
Jungia altissima, xix. 542.
Jussieua linifolia, xxiv. 263.
Justicia, xxiv. 79, 203.
Clinopodium, xi. 304.
galapagana, xxiv. 203, 234, 243.
linearis, ix. 161.
Pringlei, i. 173; xxiv. 203.

Kallstroemia, xxiv. 156, 237.
adscendens, xxiv. 156, 229.
brachystylis, xxiv. 157.
maximus, xxiv. 157.
Kallymenia, xxiv. 98.
Kleinia jorullensis, x. 32.
Knautia, xii. 57.
Knesebeckia, vi. 317.
Kosteletzkya digitata, ii. 166.
Krinitzkia linifolia, iii. 113.
Kyllinga, xxiv. 79, 130, 237.
caespitosa, xxiv. 130.
nudiceps, xxiv. 262.
odorata, xxiv. 263.
pumila, xxiv. 130, 227.
Kyllingia, xxiv. 130.
caespitosa, ix. 148.

Labiatae, xix. 489, 562; xxiv. 197, 241, 243.
Lachnostoma, xxv. 84.
gonoloboides, xxv. 84.
Lactuca brachyrrhyncha, xvi. 578.
integrifolia, xvi. 578.
Lagasca, xx. 467.
mollis, xx. 471.
parvifolia, xx. 471.
Lagascea, xx. 467.
angustifolia, xx. 470.
biflora, xx. 468.
decipiens, xx. 470.
glandulosa, xx. 470.
helianthifolia, xx. 468.
Heteropappus, xx. 470.
Lagascea (*continued*).
Kunthiana campestris, xx. 471.
latifolia, xx. 468.
Liebmannii, xx. 470.
macrophylla, xx. 468.
Mocinniana, xx. 469.
rubra, xx. 469.
suaveolens, xx. 468.
tomentosa, x. 43; xx. 470.
Laguncularia, xxiv. 183.
racemosa, xxiv. 183, 232, 237.
Lamiacea, xxiv. 197.
Lamourouxia, ix. 169, 174.
betonicaefolia, ix. 171.
brevifolia, ix. 170, 172.
coccinea, ix. 172.
Conzattii, xviii. 312.
cordata, ix. 172.
dependens, ix. 171.
exserta, ix. 171.
gracilis, ix. 174.
grandiflora, ix. 169.
Gutierrezii, ix. 174.
hyssopifolia, ix. 170.
integerrima, ix. 173.
laciniata, ix. 169.
lanceolata, ix. 173.
linearis, ix. 173.
longifolia, ix. 170.
loxensis, ix. 173.
macrantha, ix. 171.
microphylla, ix. 174.
multifida, ix. 169.
var. grandiflora, ix. 169.
Nelsonii, ix. 174.
ovata, ix. 171.
parviflora, ix. 170.
parvifolia, ix. 174.
Pringlei, ix. 170.
rhinanthifolia, ix. 171, 174.
scabra, ix. 174.
serratifolia, ix. 173.
Smithii, ix. 172.
spathacea, ix. 170.
subincisa, ix. 172.
sylvatica, ix. 172.
tenuifolia, ix. 173; xviii. 312.
var. micrantha, xviii. 313.
viejensis, ix. 172.
virgata, ix. 173.
viscosa, ix. 172.
xalapensis, ix. 160.
Lantana, xxiv. 195.
canescens, xxiv. 195, 196.
lilacina, xxiv. 196.
odorata, xxiv. 195.
peduncularis, ix. 147, 149; xxiv. 195, 233.

Lantana (*continued*).
recta, xxiv. 195.
sp., xxiv. 195.
Laphamia **Toumeyi**, ix. 176.
Laportea canadensis, xxiv. 132.
Larbrea, vi. 281.
aquatica, vi. 281.
uliginosa, vi. 285.
Laurencia, xxiv. 98.
obtusa, var. gracilis, xxiv. 98.
Laurentia, i. 167.
michoacana, i. 167.
var. ovatifolia, i. 167.
ovatifolia, i. 166.
ramosissima, i. 167.
saturejoides, xii. 61.
Laxiflorae, xix. 566.
Lecanora, xxiv. 85.
glaucovirens, xxiv. 83, 85.
Lecidea flavo-aureolata, xxiv. 84.
Lecocarpus, ix. 141; xxiv. 213, 238, 242.
foliosus, xxiv. 213, 235.
pinnatifidus, ix. 146; xxiv. 213.
Leguminosae, xxiv. 147, 241, 243, 245, 248, 251.
Lejeunea pogonoptera, xxiv. 261.
Lejica, x 14.
Lemna, xxiv. 130, 237.
sp., xxiv. 130, 227.
Lemnaceae, xxiv. 130.
Leonia salvifolia, xix. 553.
Leontophthalmum, x. 21.
Lepachys columnaris, var. pulcherrima, xvi. 576.
Lepicystis lanceolata, xxiv. 112.
percussa, xxiv. 113.
squamata, xxiv. 113.
Lepidium didymum, xxiv. 146.
Lepigonum, vi. 309.
chilense, vi. 312.
gracile, vi. 311.
macrothecum, vi. 312.
marinum, vi. 312.
medium, vi. 312.
salinum, vi. 312.
tenue, vi. 311.
Leptocalyx, iii. 106.
Leptochloa, xxiv. 121, 262.
albemarlensis, ix. 145, 149; xxiv. 121, 226.
brachiata, ix. 145.
filiformis, xxiv. 121, 226.
hirta, xxiv. 121.
Hookeri, xxiv. 121.
Lindleyana, ix. 149; xxiv. 121, 226.
mucronata, xxiv. 121, 226, 245.
scabra, xxiv. 262.
virgata, xxiv. 121, 226.
Leptogium azureum, xxiv. 261.
Leptostachya, ix. 143; xxiv. 203.
Leptostachyae, xiii. 315.
Leptosyne arizonica, var. **pubescens**, viii. 118.
mexicana, ii. 177; ix. 156.
pinnata, ii. 176.
Pringlei, ix. 155.
Liabum, xi. 293; xii. 61.
Andrieuxii, xi. 293.
andromachioides, xi. 293.
angustissimum, xi. 294.
asclepiadeum, xi. 293.
cervinum, vi. 317; xi. 294.
Deppeanum, xi. 293.
discolor, xi. 293, 294.
glabrum, x. 49; xi. 293, 294.
var. **hypoleucum**, xi. 294.
Klattii, ix. 156; xi. 294.
Liebmannii, xi. 294.
Palmeri, vi. 318; xi. 294.
platylepis, xi. 293.
polyanthum, xi. 293.
Pringlei, x. 49; xi. 249; xviii. 342.
sericolepis, xi. 294.
Lichen complanatus, xxiv. 86.
flavicans, xxiv. 88.
leucomelas, xxiv. 85.
Lichenes, xxiv. 79, 83.
Ligusticum, ii. 169.
Liliaceae, xxiv. 241.
Linaceae, xxiv. 156.
Linum, xxiv. 156.
oligophyllum, xxiv. 156, 229.
Lipactinia, xvi. 535, 536, 563.
Liparis elliptica, vi. 323.
Galeottiana, vi. 322.
Lipochaeta, xxiv. 214, 238.
laricifolia, xxiv. 214, 235.
Lipotriche gymnolomoides, xvi. 526.
Lippia, vii. 391; ix. 147; xxiv. 196, 214.
appendiculata, vii. 390.
canescens, xxiv. 196, 233.
chrysantha, xxv. 87.
lanceolata, xxiv. 196.
nodiflora, ix. 147; xxiv. 196.
nutans, ix. 162.
oaxacana, ix. 162; xxv. 87.
rosmarinifolia, ix. 147; xxiv. 196, 233.
salicifolia, xxiv. 196, 233.
Lithobrachia, xxiv. 114.
Lithocardium Hookerianum, xxiv. 190.
leucophlyctis, xxiv. 190.
revolutum, xxiv. 191.
Scouleri, xxiv. 191.
Lithophyllum, xxiv. 98.
clandescens, xxiv. 98.

Lithophyllum (*continued*).
Farlowii, xxiv. 98.
Lithospermum **calcicola**, ii. 182.
matamorense, ii. 182.
oblongifolium, xi. 300.
Palmeri, xi. 300.
revolutum, ii. 182.
strictum, ii. 183.
Lithothamnium, xxiv. 98.
crassum, xxiv. 98.
Farlowii, xxiv. 98.
Litobrochia pedata, xxiv. 114.
Littaea, xvi. 567.
Loasaceae, xxiv. 178.
Lobelia, i. 167; xxiv. 208.
gruina, var. **conferta**, xxi. 503.
irasuensis, iii. 112.
laxiflora, xxi. 503.
micrantha, i. 167.
Nelsonii, xxi. 503.
novella, i. 167; xiv. 489.
Orizabae, iii. 112.
parviflora, i. 167.
pauciflora, iii. 112.
picta, iii. 112.
Plumieri, xxiv. 208.
ramosissima, i. 167.
regalis, xxi. 503.
Sartorii, i. 168.
tarsophora, xiv. 489.
Tuerckheimii, i. 167.
xalapensis, xxiv. 208, 235.
Lobeliaceae, i. 168.
Loeflingia, v. 126, 154.
pusilla, v. 155.
squarrosa, v. 155.
texana, v. 155.
Lonchitis repens, xxiv. 109.
Longiflorae, xix. 531.
Lopezia **angustifolia**, ii. 168.
Lopholejeunea, xxiv. 100.
Anderssonii, xxiv. 100.
Loranthaceae, xxiv. 133. 243.
Loranthus, ix. 164.
inconspicuus, ix. 164.
inornus, ix. 163.
Lorentea, xii. 59–63, 65, 66, 77.
auricularis, xii. 62, 82.
var. acapulcensis, xii. 82.
canescens, xii. 61, 82.
capillipes, xii. 81.
gracilis, xxiv. 214.
Haenkeana, xii. 62, 81.
humifusa, xii. 61.
linearis, xxiv. 214.
multifloseulosa, xii. 70, 71, 82.
polycephala, xii. 78.
prostrata, xii. 59.
Lorentea (*continued*).
satureioides, xii. 82.
saturejoides, xii. 82.
sessiliflora, xii. 61.
subsquarrosa, xxiv. 215.
tenuifolia, xxiv. 215.
Lucuma nervosa, xii. 88.
Palmeri, xii. 87.
Rivicoa, xii. 88.
Luteae, xix. 531.
Lychnis, v. 124, 125, 129, 147.
acaulis, v. 132.
affinis, v. 149, 150.
ajanensis, v. 149.
alba, v. 151.
alpina, v. 147. 152.
apetala, v. 147, 150.
var. elatior, v. 150, 151.
" glabra, v. 151
" macropetala, v. 151.
" pauciflora, 148, 149.
californica, v. 143.
Coronaria, v. 152.
dioica, var. *α*, v. 151.
var. *α*, rubra, v. 151.
" *β*, v. 151.
diurna, v. 151.
Drummondii, v. 147.
elata, v. 148.
Flos-cuculi, v. 151.
frigida, v. 150.
Githago, v. 153.
Kingii, v. 149, 150.
montana, v. 149, 151.
nuda, v. 148.
Parryi, v. 148.
pulchra, v. 136.
suecica, v. 152.
Taylorae, v. 150.
triflora, v. 149, 150.
var. **Dawsoni**, v. 149.
vespertina, v. 151.
Lychnis § Githago, v. 152.
Lycium, ix. 147; xxiv. 199.
cestroides, xix. 566.
geniculatum, xix. 566.
retusum, viii. 120.
sp., xxiv. 199. 233.
Lycopersicon, xxiv. 199.
peruanum, xxiv. 199.
Lycopersicum, xxiv. 199.
esculentum, ix. 147; xxiv. 199, 200.
var. minus, xxiv. 199, 233.
peruvianum, xxiv. 199.
var. parviflorum, xxiv. 199, 234.
pimpinellifolium, xxiv. 199. 234.
sp., xxiv. 200, 234.
Lycopodiaceae, xxiv. 115

Lycopodium, xxiv. 115.
clavatum, ix. 149; xxiv. 115, 225.
dichotomum, xxiv. 115, 225.
mandiocanum, xxiv. 115.
mollicomum, xxiv. 262.
pithyoides, xxiv. 115.
sp., xxiv. 225.
Lycoseris **macrocephala**, xxv. 119.
Lygodesmia aphylla, xviii. 315.
juncea, xviii. 315.
ramosissima, xviii. 315.
Lysimachia nummularia, vi. 320.
thyrsiflora, xxiii. 184.
Lythraceae, xxiv. 182, 241.

Maba albens, xii. 88, 89.
Machaonia **floribunda**, xiv. 488.
Macraea, xxiv. 242.
laricifolia, ix. 147; xxiv. 214.
Macrohoustonia, xi. 292, 293.
Macrolejeunea subsimplex, xxiv. 261.
Macromeria **Pringlei**, xvi. 570.
Macromitrium, xxiv. 103.
longifolium, xxiv. 103.
scabrisetum, xxiv. 103.
Macrostachyae, xix. 530; xxi. 501.
Maiden Pink, v. 127.
Malachia, vi. 281.
aquatica, vi. 281.
Malachra, xxiv. 174.
capitata, xxiv. 174, 231.
Malaxis Galeottiana, vi. 322.
Mallostoma acerosa, xi. 291.
Shannoni, xi. 284.
Malvaceae, xxiv. 173, 241, 243, 248.
Malvaviscus acerifolius, ix. 176.
cinereus, ix. 176.
Pringlei, ix. 175, 176.
Mandonia, x. 3.
boliviensis, x. 6.
Manihot, xxiv. 169; xxv. 82.
caudata, xxv. 82.
utillissima, xxiv. 169, 231.
Mappia, ix. 150.
mexicana, ix. 150.
racemosa, ix. 150.
Maprounea, xxi. 494.
Maravilla, x. 33.
Marchesinia, xxiv. 101.
brachiata, xxiv. 101.
Margaranthus solanaceus, xix. 567.
sulphureus, xix. 566.
Marginaria ensifolia, xxiv. 111.
incana, xxiv. 112.
Mariscus brachystachys, xxiv. 126.
cornutus, xxiv. 128.
Mutisii, xxiv. 128.
rufus, xxiv. 127.
Marsilia **mollis**, viii. 123.
Mastogloia panduriformis, xxiv. 90.
submarginata, xxiv. 90.
Maurandia erecta, viii. 120.
geniculata, viii. 120.
Maytenus, xxiv. 170.
obovata, ix. 145; xxiv. 170, 231, 245.
Megalastrum, viii. 117.
Melampodium, xviii. 316; xx. 455, 456.
achillaeoides, xx. 465.
americanum, xx. 459, 466.
angustifolium, xx. 461.
appendiculatum, xx. 457.
var. **leiocarpum**, xx. 457.
" **sonorense**, xx. 457.
arenicola, xx. 457.
arvense, xx. 464.
australe, xx. 465.
Baranguillae, xx. 465.
Baranquillae, xx. 465.
Berterianum, xx. 465.
bibracteatum, xx. 464, 465.
brachyglossum, xviii. 317; xx. 465.
camphoratum, xx. 456, 463, 465, 466.
cinereum, xx. 458, 459.
var. argophyllum, xx. 458.
" ramosissimum, xx. 458, 466.
copiosum, xx. 463, 465.
coronopifolium, xx. 464, 465.
cupulatum, xx. 457, 463.
diffusum, xx. 456, 460, 466.
var. **lanceolatum**, xx. 460, 466.
digynum, xx. 463, 465.
divaricatum, ii. 173; xx. 463, 465.
Dombeyanum, xx. 466.
flaccidum, xx. 464.
glabrum, xx. 465.
gracile, xx. 462.
heterophyllum, xx. 460, 461.
var. β, xx. 460.
Hidalgoa, xx. 466.
hirsutum, xx. 466.
hispidum, xx. 459, 464, 465.
humile, xx. 466.
Kunthianum, xx. 460.
lanceolatum, xx. 460, 466.
leucanthum, xx. 458.
Liebmannii, xx. 463, 466.
linearilobum, xx. 459, 466.
longicorne, xx. 457.
longicornu, xx. 457.
longifolium, xx. 465, 466.
longipes, xx. 459, 466.
longipilum, ii. 173; xx. 458.
manillense, xx. 460, 466.

Melampodium (*continued*).
microcephalum, xx. 462, 466.
mimulifolium, xx. 462.
montanum, xx. 461, 463, 466.
oblongifolium, xx. 462, 466.
ovatifolium, xx. 466.
paludicola, xx. 456, 466.
paludosum, xx. 463, 465, 466.
panamense, xx. 463, 466.
paniculatum, xx. 462, 466.
perfoliatum, xx. 465.
Pringlei, xx. 461.
pumilum, xx. 463, 466.
ramosissimum, xx. 458, 466.
rhomboideum, xx. 465, 466.
Rosei, xx. 461.
var. **subintegrum**, xx. 462.
ruderale, xx. 466.
sericeum, xx. 455, 456, 459, 460, 464, 466.
var. brevipes, xx. 466.
" **exappendiculatum**, xx. 459.
" longipes, xx. 459, 466.
sinuatum, xx. 461.
suffruticosum, xx. 456.
tenellum, xx. 463.
var. flaccidum, xx. 464.
ternatum, xx. 466.
Melandrium, v. 147.
affine, v. 150.
rubrum, v. 151.
silvestre, v. 151.
triflorum, v. 149.
Melandryum album, v. 151.
apetalum, v. 151.
Baldwini, v. 134.
Bolanderi, v. 137.
californicum, v. 136.
Greggii, v. 136.
Hookeri, v. 137.
involucratum, var. affine, v. 150.
laciniatum, var. Greggii, v. 136.
pennsylvanicum, v. 134.
regium, v. 135.
rotundifolium, v. 135.
Wrightii, v. 137.
Melanocarpum Sprucei, xxiv. 137.
Melastomaceae, xxiv. 183, 241, 243.
Melobesia, xxiv. 98.
corticiformis, xxiv. 98.
pustulata, xxiv. 98.
Melosira tuberculosa, xxiv. 90.
Membranaceae, xix. 491, 496.
Mendezia bicolor, x. 16.
Menispermaceae, xxiv. 146.
Menodora helianthemoides, var. **parviflora**, xvi. 569.
Mentha aquatica, xix. 510.
Mentzelia, xxiv. 178.
aspera, ix. 146; xxiv. 178, 232.
Conzattii, xi. 298.
Menyanthes trifoliata, xxiii. 184.
Merckia, vi. 291.
physodes, vi. 291.
Merremia pentaphylla, xxiv. 188.
Metachlamydeae, xxv. 69.
Metastelma, xi. 299.
macropoda, xiv. 481.
pedunculare, xiv. 481.
Miconia, xxiv. 79.
nitidissima, xxiv. 183.
Robinsoniana, xxiv. 183, 232.
sp., ix. 146; xxiv. 183.
Micranthae, xix. 490, 491, 496; xxi. 499.
Microcephalum Ehrenbergianum, xvii. 94.
Liebmannii, xvii. 96.
sericeum, xvii. 100.
Microcoecia repens, xxiv. 212.
Micropetalon, vi. 281.
gramineum, vi. 283, 284.
lanceolatum, vi. 286.
lanuginosum, vi. 293.
longifolia, vi. 283.
Microsphaceae, xix. 490.
Microstylis montana, x. 36.
platyglossa, x. 35.
streptopetala, x. 36; xi. 297.
Mikania, x. 10; xvii. 105.
amara, x. 12.
angulata, x. 13.
cordifolia, x. 13; xvii. 107, 108.
coriacea, x. 13.
denticulata, x. 13.
eriophora, x. 12.
var. **chiapensis**, xviii. 341.
Fendleri, x. 13; xvii. 107.
globosa, x. 11.
gonoclada, x. 13.
Gonzalezii, xvii. 107.
Guaco, x. 12.
Hookeriana, x. 12.
Houstonis, x. 11.
leiostachya, x. 12.
olivacea, x. 12; xvii. 107.
orinocensis, x. 13.
pterocaula, x. 12.
punctata, x. 10, 13; xvii. 107.
pyramidata, x. 12; xviii. 341.
repanda, x. 13.
scandens, x. 11, 13.
smilacina, x. 11.
suaveolens, x. 13.
Tlalixcoyan, x. 13.

Mimosa, xiii. 305, 306; xxiv. 152, 237.
acanthocarpa, ix. 150; xiii. 306, 326.
var. **desmanthocarpa**, xx. 472.
acutiflora, xiii. 328.
adenantheroides, xiii. 315, 320.
aeschynomenes, xiii. 330.
affinis, xiii. 312.
albida, xiii. 306, 310, 311.
var. **euryphylla**, xiii. 311.
" **floribunda**, xiii. 310, 311.
" **glabrior**, xiii. 311.
" **strigosa**, xiii. 311.
angusta, xiii. 308.
arcuata, xiii. 307.
asperata, xiii. 306, 331; xxiv. 152, 229.
var. **Berlandieri**, xiii. 331.
Berlandieri, xiii. 306, 331.
biuncifera, xiii. 306, 307, 326, 327.
var. **flexuosa**, xiii. 327.
" **Lindheimeri**, xiii. 328.
borealis, xiii. 324, 326.
var. texana, xiii. 226.
Brandegei, xiii. 316.
Cabrera, xiii. 321.
caerulea, xiii. 313.
caerulescens, xiii. 314.
calcicola, xiii. 325.
camporum, xiii. 330.
canescens, xiii. 331.
cinerea, xiii. 318.
coelocarpa, xiii. 319.
costaricensis, xiii. 329.
Deamii, xviii. 324.
debilis, xiii. 309.
var. panamensis, xiii. 310.
depauperata, xiii. 325, 326.
diplotricha, xiii. 329.
distachya, xiii. 316.
disticha, xiii. 318.
dormiens, xiii. 330.
dysocarpa, xiii. 320.
Emoryana, xiii. 322.
Ervendbergii, xiii. 306, 329, 330.
eurycarpa, xiii. 322.
eurycarpoides, xx. 472.
fasciculata, xiii. 318.
var. **malacocarpa**, xiii. 319.
flaviseta, xiii. 330.
flexuosa, ix. 150; xiii. 327.
floribunda, xiii. 309, 311.
fragrans, xiii. 324.
Galeottii, xiii. 323.
geminata, xiii. 307.
glaucescens, xiii. 308.
Goldmanii, xiii. 308.
Grahami, xiii. 321, 326.
guatemalensis, xiii. 315.

Mimosa (*continued*).
hispida, xiii. 331.
Hostmanni, xiii. 309.
humilis, xiii. 331.
intermedia, xiii. 331.
invisa, xiii. 329.
ionema, xx. 473.
lacerans, xiii. 323.
lacerata, xiii. 323.
lactiflua, xiii. 313; xviii. 325.
laxiflora, xiii. 316, 317.
var. **zygophylloides**, xiii. 317.
Lemmoni, xiii. 321, 326.
leptocarpa, xiii. 315.
leucaenoides, xiii. 324.
Lindheimeri, xiii. 328.
malacophylla, xiii. 328.
var. glabra, xiii. 328.
" glabrata, xiii. 329.
manzanilloana, xiii. 308, 309.
minutifolia, ix. 150; xiii. 322.
mollis, xiii. 323.
monancistra, xiii. 321.
Nelsonii, xiii. 314.
notata, xiii. 309.
Palmeri, xiii. 318.
palpitans, xiii. 328.
pellita, xxiv. 152.
pigra, xiii. 331.
Pittieri, xiii. 312.
platycarpa, xiii. 321.
podocarpa, xiii. 328.
polyacantha, xiii. 331.
polyancistra, xiii. 329.
polyantha, xiii. 317.
var. **levior**, xiii. 318.
Pringlei, xiii. 326.
prolifica, xiii. 327.
psilocarpa, xviii. 325.
puberula, xiii. 320.
pudica, xiii. 311, 312.
purpurascens, xiii. 317.
pusilla, xiii. 330.
Rosei, xiii. 317.
sensitiva, xiii. 310.
sesquijugata, xiii. 308.
sicyocarpa, xiii. 313.
Skinneri, xiii. 311.
somnians, xiii. 328.
somniculosa, xiii. 328.
spirocarpa, xiii. 315.
Spruceana, xx. 474.
strigillosa, xiii. 330.
strigosa, xiii. 311.
tenuiflora, xiii. 321, 323, 324.
tequilana, vi. 316; xiii. 307.
tricephala, xiii. 312.
trijuga, xiii. 328.

Mimosa (*continued*).
Velloziana, xiii. 309, 311.
virgata, xiii. 332.
viva, xiii. 309.
Watsoni, xx. 473.
Wrightii, xiii. 419.
Xanti, xiii. 314.
zygophylla, xiii. 323.
Mimosa § Rubicaules, xiii. 306.
" § Sensitivae, xiii. 306.
Mimulus, x. 39.
Congdonii, i. 175.
deflexus, i. 176.
dentilobus, viii. 120.
gracilipes, i. 176.
Kelloggii, i. 175.
latifolius, i. 175, 176.
madrensis, viii. 121.
pulchellus, i. 175.
ringens, xx. 462.
rubellus, i. 176.
Minthidium, xix. 565.
Mirasolia calva, xvii. 103.
scaberrima, xvii. 102.
Mirto, xix. 535.
Mocinna brachiata, x. 29.
serrata, x. 27.
Modestae, xiii. 307.
Moehringia, vi. 290.
lateriflora, vi. 290.
macrophylla, vi. 290.
umbrosa, vi. 293.
Moenchia quaternella, vi. 281.
Mollissimi, iv. 117.
Mollugo, xxiv. 143.
flavescens, ix. 146; xxiv. 143, 228.
var. **floriana**, xxiv. 143, 228.
gracilis, xxiv. 143.
gracillima, ix. 146; xxiv. 143, 228.
Snodgrassii, xxiv. 144, 228.
verticillata, xxiv. 143.
Momordica, xxiv. 208, 237.
Charantia, ix. 146; xxiv. 208, 235.
Monarda didyma, xxi. 501.
Pringlei, xxi. 501.
Moneses grandiflora, xxiii. 184.
Monocotyledonae, xxv. 69.
Montagnaea, xvi. 508.
arborescens, xvi. 515, 516; xx. 487.
clematidea, xvi. 520.
ensifolia, xvi. 521; xvii. 100.
floribunda, xvi. 509.
frutescens, xvi. 515.
grandiflora, xvi. 515, 519.
heracleifolia, xvi. 520.
heterophylla, xvi. 521.
hibiscifolia, xvi. 513.
Karwinskii, xvi. 520.
Montagnaea (*continued*)
ovalifolia, xvi. 515.
purpurea, xvi. 521.
speciosa, xvi. 519.
tomentosa, xvi. 510.
var. cordifolia, xvi. 510.
" ternifolia, xvi. 510.
Montagnaea § Acanthocarphae, xvi. 512.
Montagnaea § Eriocarphae, xvi. 509.
Montanae, xxii. 506, 507.
Montanoa, xvi. 507, 508, 521; xxv. 100.
anomala, xvi. 509.
arborescens, xvi. 515, 516; xx. 487, 488.
Aschenbornii, xvi. 520.
atriplicifolia, xvi. 515, 516, 520.
bipinnatifida, xvi. 519, 520.
clematidea, xvi. 520, 521.
crenata, xvi. 520.
dumicola, xvi. 518.
elegans, xvi. 520.
floribunda, xvi. 509, 515.
frutescens, xvi. 514; xx. 488.
gracilis, xvi. 518.
grandiflora, xvi. 515, 518, 519, 566.
guatemalensis, xvi. 514.
heracleifolia, xvi. 520.
heterophylla, xvi. 520.
hexagona, xvi. 514.
hibiscifolia, xvi. 513, 517.
Karwinskii, xvi. 520.
Karwinskyi, xvi. 520.
macrolepis, x. 44; xvi. 512; xxv. 100, 108.
microcephala, xvi. 510.
mollissima, xvi. 519.
myriocephala, xvi. 511.
Olivae, xvi. 521.
Orbignyana, xvi. 521.
ovalifolia, xvi. 515, 520.
Palmeri, xii. 93; xvi. 511.
patens, xvi. 514, 516, 517, 520.
pauciflora, xvi. 517, 518.
Pittieri, xvi. 517, 518.
Pringlei, xvi. 512.
purpurascens, xvi. 515.
purpurea, xvi. 521.
pyramidata, xvi. 519, 520.
quadrangularis, xvi. 513.
Rosei, x. 45; xvi. 512.
samalensis, xvi. 513.
Schottii, xvi. 518.
Seleriana, xvi. 520.
sp., x. 45; xvi. 509, 512.
speciosa, xvi. 519.
subtruncata, xvi. 516.
ternifolia, xvi. 510.
Thomasii, xvi. 521; xvii. 94.
tomentosa, xvi. 510.

Montanoa (*continued*).
tomentosa, xvi. 510, 520, 521.
var. ternifolia, xvi. 510.
triloba, xvi. 521.
uncinata, xvi. 516.
xanthifolia, xvi. 511, 521.
Morella, xi. 301.
Moss Campion, v. 132.
Mouse-ear Chickweed, vi. 275, 276.
Muhlenbergia capillaris, iv. 122.
Seatoni, iv. 122.
Mulgedifolii, xxv. 119.
Mullein Pink, v. 152.
Muscari botryoides, xix. 507.
Musci, xxiv. 79, 102.
Myosoton, vi. 281.
Myriophyllum, xxiv. 183.
sp., xxiv. 183, 232.
Myrtaceae, xxiv. 182, 241, 243.

Najadaceae, xxiv. 116.
Najas, xxiv. 89, 116.
latifolia, xxiv. 116.
marina, var. latifolia, xxiv. 116, 225, 237.
Nama dichotoma, var. parvifolia, xxv. 86.
latifolium, x. 39.
origanifolia, xxv. 86.
origanifolium, xxv. 86.
parvifolium, xxv. 85, 86.
pueblense, x. 39.
Pringlei, x. 38.
rupicola, xxv. 86.
rupicolum, xxv. 85.
Nanae, xxiii. 186, 190.
Nassella pubiflora, iv. 122.
Navicula Anderssonii, xxiv. 90.
Eugeniae, xxiv. 90.
gallapagensis, xxiv. 90.
Hennedyi, var. minuta, xxiv. 90.
var. undulata, xxiv. 90.
jugata, xxiv. 90.
Platessa, xxiv. 90.
Neckera Anderssonii, xxiv. 103.
nigrescens, xxiv. 103.
Nemacladus, i. 168.
oppositifolius, i. 168.
Nemastylis acuta, xi. 296.
bracteolata, vi. 323.
caerulescens, xi. 296.
Dugesii, ix. 167.
flava, vi. 323; ix. 167.
geminiflora, xi. 296.
Neottia calcarata, xix. 562.
Nephrodium, xxiv. 110.
brachyodon, xxiv. 110, 224.
macrophyllum, xxiv. 110, 224.
molle, xxiv. 110, 224.
Nephrodium (*continued*).
pectinatum, xxiv. 110.
unitum, xxiv. 110, 224.
villosum, xxiv. 110, 225.
Nephrolepis, xxiv. 110.
acuta, xxiv. 110, 225, 241, 261.
cordifolia, ix. 149; xxiv. 110, 111.
β, xxiv. 110.
pectinata, xxiv. 110, 225.
Neptunia, xiii. 332; xxiv. 152.
floridana, xiii. 333.
Lindheimeri, xiii. 333.
lutea, xiii. 332, 333.
var. **tenuis**, xiii. 332.
oleracea, xiii. 332.
plena, xxiv. 152, 229.
pubescens, xiii. 333.
surinamensis, ix. 146; xxiv. 152.
tenuis, xiii. 332.
triquetra, xxiv. 79.
Neurocallis aureo-nitens, xxiv. 104.
Neurolaena **macrocephala**, xxv. 118.
macrophylla, xxv. 118.
semidentata, xxv. 118.
Nicotiana, ix. 142; xxiv. 200.
glutinosa, xxiv. 200, 234.
sp., xxiv. 200, 234.
Tabacum, xxiv. 200, 234.
Nissolia confertiflora, var. **laxior**, vi. 315.
Nocca, xx. 467.
angustifolia, xx. 470.
biflora, xx. 468.
decipiens, xx. 470.
glandulosa, xx. 470.
helianthifolia, xx. 468.
var. **levior**, xx. 468.
" **suaveolens**, xx. 468.
Heteropappus, xx. 470.
latifolia, xx. 468.
Liebmannii, xx. 470.
Mociniana, xx. 469.
mollis, xx. 471.
n. sp., xx. 468.
Palmeri, xx. 471.
Pringlei, xx. 469.
rigida, xx. 469.
tomentosa, xx. 470.
Noccaea, xx. 467.
angustifolia, xx. 470.
biflora, xx. 468.
decipiens, xx. 470.
helianthifolia, xx. 468.
Heteropappus, xx. 470.
macrophylla, xx. 468.
Mociniana, xx. 469.
mollis, xx. 471.
rubra, xx. 469.
suaveolens, xx. 468.

Nothoclaena, xxiv. 111.
argentea, xxiv. 111.
candida, xxiv. 111.
sulphurea, xxiv. 111, 225.
Notothylas, xxiv. 101.
orbicularis, xxiv. 101.
Nyctaginacea, xxiv. 143.
Nyctaginaceae, xxiv. 141, 228, 241, 243, 250.
Nycterium, xix. 570.

Oaxacania, ix. 151.
malvaefolia, ix. 151.
Obeliscaria pulcherrima, xvi. 576.
Ochractinia, xvi. 535, 559.
Ochtodes, xxiv. 99.
filiformis, xxiv. 99.
Ocimum micranthum, xix. 542.
Oedogonium, xxiv. 89.
sp., xxiv. 89.
Oenoe, i. 176.
Oldenlandia acerosa, xi. 291.
angustifolia, xi. 285.
var. filifolia, xi. 285.
humifusa, xi. 287.
Pringlei, ii. 169.
rubra, xi. 287.
subviscosa, xi. 288.
xestosperma, x. 41.
Old Field Birch, xxiii. 171.
Olfersia Langsdorfii, xxiv. 104.
muscosa, xxiv. 104.
viscida, xxiv. 105.
viscosa, xxiv. 105.
Omphalanthus, xxiv. 101.
filiformis, xxiv. 101.
Omphalodes **acuminata**, i. 170.
cardiophylla, i. 170.
Onagraceae, xxiv. 241.
Oplismenus, xxiv. 121.
Colonus, ix. 148; xxiv. 122.
setarius, ix. 148; xxiv. 121, 226.
undulatifolius, xxiv. 121.
Opuntia, xxiv. 125, 180, 236, 237, 245, 247, 248, 251.
galapageia, xxiv. 180, 232.
Helleri, xxiv. 180, 181, 232, 251.
myriacantha, xxiv. 181, 232.
sp., xxiv. 232.
Orchidaceae, xxiv. 131, 243.
Orthotrichum Jamesoni, xxiv. 104.
longifolium, xxiv. 103.
Oryzopsis **pubiflora**, iv. 122.
Ossaea macrophylla, xxiv. 263.
Oteiza, x. 21.
acuminata, x. 22.
Orthodon, vi. 276.
Otopappus, i. 166; xvi. 536, 554, 557.
Otopappus (*continued*).
alternifolius, i. 165; xvi. 554.
epaleaceus, i. 166.
oaxacanus, xvi. 557.
olivaceus, xvi. 557.
Robinsonii, xvi. 554.
Ovales, xxii. 467.
Oxalidaceae, xxiv. 156, 243.
Oxalis, xxiv. 156.
Agassizi, ix. 145; xxiv. 156.
Barrelieri, xxiv. 156.
carnosa, ix. 145; xxiv. 156, 229.
Cornelli, xxiv. 156, 229.
corniculata, ix. 145; xxiv. 156, 229.
Oxybaphus viscosus, xxv. 78.

Padina, xxiv. 91.
Durvillaei, xxiv. 91.
Pavonia, xxiv. 92.
Paederia **Pringlei**, xxv. 92.
Pallasia dentata, xvi. 556.
Palmerella, i. 167.
Palo santo, xxiv. 88.
Panetos, xi. 283.
Panicum, xxiv. 122.
caudatum, xxiv. 125.
cayennense, xxiv. 122.
colonum, xxiv. 122, 226.
fasciculatum, xxiv. 122, 226.
fluitans, xxiv. 122, 226.
fuscum, ix. 148; xxiv. 122–124, 226.
f. firmius, xxiv. 122.
" pubescens, xxiv. 122.
" vegetius, xxiv. 122.
hirticaulon, ix. 148; xxiv. 122.
var. glabrescens, xxiv. 122.
" majus, xxiv. 122.
hirticaulum, xxiv. 122, 226.
var. minus, xxiv. 123, 226.
molle, xxiv. 123, 226.
multiculmum, xxiv. 123, 226.
paspalodes, xxiv. 122.
paspaloides, xxiv. 122.
sanguinale, xxiv. 123, 226, 241.
serotinum, xxiv. 123, 226.
setosum, xxiv. 125.
Paper Birch, xxiii. 171.
Papillaria, xxiv. 103.
nigrescens, xxiv. 103.
Parallelinervia, iv. 118.
Parathesis **chiapensis**, xxi. 497.
sessilifolia, xxi. 498.
Parietaria, xxiv. 132.
debilis, xxiv. 132, 227.
floridana, xxiv. 132.
macrophylla, ix. 165.
microphylla, xxiv. 133.
Paritium tiliaceum, xxiv. 174.

Parkinsonia, xxiv. 152, 237.
aculeata, ix. 146; xxiv. 152, 229.
Parmelia, xxiv. 85.
leucomela, xxiv. 85.
var. filiformis, xxiv. 86.
perlata, xxiv. 85.
physodi, xxiv. 85.
sp., xxiv. 85.
usneoides, xxiv. 86.
Parnassia palustris, xxiii. 184.
Paspalum, xxiv. 123.
arenarium, xxiv. 124.
canescens, ix. 148; xxiv. 123, 124, 226.
conjugatum, ix. 148; xxiv. 123, 226, 241, 262.
distichum, xxiv. 123, 226, 241.
longe-pedunculatum, xxiv. 124, 226.
penicillatum, xxiv. 124, 226.
platycaule, xxiv. 262.
scrobiculatum, xxiv. 124, 226.
serotinum, xxiv. 123.
sp., xxiv. 124, 226.
vaginatum, ix. 148; xxiv. 123.
Paspalus serotinus, xxiv. 123.
Passiflora, xxiv. 177.
foetida, ix. 146; xxiv. 177, 232.
linearifolia, xxiv. 177.
lineariloba, xxiv. 177, 231.
Pringlei, ix. 151.
puberula, xxiv. 177, 232.
suberosa, xxiv. 177.
var., ix. 146; xxiv. 177.
var. lineariloba, xxiv. 177.
tridactylites, xxiv. 177.
Passifloraceae, xxiv. 177, 243.
Pavonia hirtiflora, iii. 104.
melanommata, iii. 104.
Pearlwort, vi. 306.
Pectideae, xii. 61.
Pectidium, xii. 61–66, 85.
punctatum, xii. 61, 85; xxiv. 215.
subciliaris, xxiv. 215.
Pectidopsis, xii. 61–63, 65, 66, 72, 79.
angustifolia, xii. 73.
Pectis, xii. 57–66, 72, 85; xxiv. 214.
ambigua, xii. 65, 84.
anceps, xii. 67.
Anderssonii, xxiv. 214, 235.
angustifolia, xii. 60, 61, 63, 65, 73.
var. subaristata, xii. 73.
aquatica, xii. 83.
arenaria, xii. 62, 65, 70, 71, 82.
auricularis, xii. 82.
Berlandieri, xii. 65, 73, 78.
var. Palmeri, xii. 75.
bibracteata, xii. 71.
Bonplandiana, xii. 60, 61, 69.
bracteata, xii. 65, 71.
Pectis (*continued*).
Burchellii, xxiv. 215.
canescens, xii. 60–62, 65, 70, 82; xxv. 118.
var. villosior, xii. 83.
capillaris, xii. 63, 65, 74.
var. paucicapitata, xii. 74.
capillipes, xii. 81.
Carthusianorum, xii. 58.
ciliaris, xii. 57–59, 61, 66, 67, 70.
ciliata, xii. 67.
costata, xii. 67.
Coulteri, xii. 62, 63, 84.
depressa, xii. 71.
dichotoma, xii. 75.
diffusa, xii. 62, 65, 74, 78.
elongata, xii. 60, 61, 65, 73, 77, 79.
var. Schottii, xii. 78.
fasciculata, xii. 59, 62, 73.
fasciculiflora, xii. 73.
fastigiata, xii 62, 63, 73.
febrifuga, xii. 63.
filipes, xii. 62, 63, 65, 75.
var. subnuda, xii. 76.
gibbosa, xii. 64.
gracilis, ix. 147; xxiv. 214, 215.
grandiflora, xii. 71.
Haenkeana, xii. 65, 80.
Hookeri, xxiv. 214, 235.
humifusa, xii. 58–61.
imberbis, xii. 63, 65, 86.
jaliscana, xii. 62, 74–76.
latisquama, xii. 82; xxv. 118.
Lessingii, xii. 67; xxi. 506.
Liebmannii, xii. 64, 83.
linearis, ix. 147; xii. 64, 69; xxiv. 214.
linifolia, xii. 57–61, 67, 85; xvi. 565; xxiv. 215, 235.
var. marginalis, xii. 85.
longipes, xii. 63, 65, 81, 82.
minuta, xii. 58, 59.
multifida, xii. 58.
multifloseulosa, xii. 70, 82.
multisecta, xii. 85.
multiseta, xii. 62, 63, 65, 84, 85.
Palmeri, xii. 79, 80.
papposa, xii. 63, 65, 72, 77, 79.
patula, xii. 70.
pinnata, xii. 58, 59.
Pringlei, xii. 76.
prostrata, xii. 58, 59, 61, 62, 67, 73.
var. cylindrica, xii. 68.
" urceolata, xii. 68.
punctata, xii. 57–61, 70, 76, 77, 85, 86; xxiv. 215.
pygmaea, xii. 58, 60, 61.
Rosei, xii. 77.

Pectis (*continued*).
Rusbyi, xii. 64, 77.
satureioides, xii. 82.
Schaffneri, xii. 68.
Seemannii, xii. 63, 69.
sinaloensis, xii. 65, 69, 72.
stenophylla, xii. 80.
stricta, xii. 78.
subsquarrosa, xxiv. 215, 235.
Swartziana, xii. 57, 58, 61, 69.
taliscana, xii. 62, 74, 79.
tenella, xii. 63, 72, 73, 79.
tenuifolia, ix. 147; xxiv. 215, 235.
uniaristata, xii. 62, 63, 75
var. holostemma, xii. 75.
Pectis § Eupectis, xii. 72.
Pectis § Pectidium, xii. 84.
Pectothrix, xii. 62–65, 72, 77.
Pedicularis canadensis, xix. 563.
eburnata, iii. 114.
Pedilanthus **Pringlei**, vi. 322.
Tithymaloides, vi. 322.
tomentellus, ix. 164.
Pelexia **Pringlei**, xix. 562.
setacea, xix. 562.
Pellaea, xxiv. 111.
geraniaefolia, **xxiv. 111, 225.**
Peltolejeunea, xxiv. 101.
galapagona, xxiv. 101.
Pennisetum, xxiv. 124.
exaltatum, xxiv. 124.
pauperum, xxiv. 124, 226.
Peperomia, xxiv. 79, 131, 238.
flagelliformis, xxiv. 131, 227.
galapagensis, xxiv. 131, 227.
galioides, xxiv. 131, 227, 243.
n. sp., xxiv. 227.
nigro-punctata, xxiv. 263.
petiolata, xxiv. 131, 227.
ramulosa, xxiv. 131, 227.
Snodgrassii, xxiv. 131, 227.
sp., ix. 148; xxiv. 132, 227.
Perezia **cuernavacana**, x. 50; xviii. 342.
formosa, ii. 180.
hebeclada, iii. 112.
michoacana, ii. 179; xviii. 342.
Nelsonii, xviii. 342.
nudicaulis, x. 50, 51.
paniculata, xviii. 313.
Pringlei, vii. 388.
rigida, ii. 180; vii. 388.
turbinata, ii. 180.
umbratilis, x. 50.
vernonioides, iii. 112.
Perimeniopsis perfoliata, xvii. 102.
Perityle leptoglossa, viii. 119.
Lloydii, viii. 118.
Palmeri, viii. 119.
Pernettya ciliaris, xxi. 497.
coriacea, xxi. 497.
ovata, xxi. 496.
Pertusaria, xxiv. 85.
albinea, xxiv. 83, 85.
Perymenium, xvi. 507, 521; xvii. 89.
album, x. 28; xvi. 529.
asperifolium, xvi. 525.
Barclayanum, xvi. 522.
Berlandieri, xvi. 528.
buphthalmoides, xvi. 523.
Cervantesii, ix. 154; xvi. 523.
chalarolepis, xvi. 525.
croceum, xvi. 527.
discolor, xvi. 527.
Ghiesbreghtii, xvi. 525.
gracile, xvi. 526.
grande, xvi. 528, 529.
var. **strigillosum**, xvi. 529.
gymnolomoides, xvi. 526.
jalicense, ix. 154; xvi. 524.
Klattii, xvi. 528.
macrocephalum, xxv. 108.
Mendezii, ix. 154; xvi. 526, 528.
var. **cylindrocephalum**, xvi. 528.
microcephalum, xvi. 525, 526.
microphyllum, xvi. 527.
Nelsonii, xvi. 529.
parvifolium, xvi. 524, 527.
pellitum, xvi. 524, 527.
Pringlei, xvi. 526.
Rosei, xvi. 523.
rude, xvi. 524, 526; xxv. 108.
subsquarrosum, xvi. 524.
tenellum, xvi. 522.
Tuerckheimii, xvi. 529.
verbesinoides, xvi. 524.
Petalostemon, viii. 116.
Petroselinum, xxiv. 184.
sativum, xxiv. 184, 232.
Peyssonnelia, xxiv. 98, 99.
rubra, xxiv. 99.
rugosa, xxiv. 98.
Phaca Edmonstonei, xxiv. 148.
Phacelia **madrensis**, xxv. 85.
namatostyla, ii. 181.
pimpinelloides, xxv. 85.
rupicola, viii. 119; xxv. 85.
Phaeophyceae, xxiv. 90.
Phalangium ciliatum, xxv. 72.
Pharbitis, xii. 89.
Nil, xxiv. 188.
Phaseolus, vii. 386; xxiv. 153.
adenanthus, xxiv. 153, 229.
Esperanzae, iv. 118.
filiformis, vii. 386.
leptostachyus, iv. 118.
microcarpus, xvi. 568.

Phaseolus (*continued*).
mollis, ix. 146; xxiv. 153, 229.
monospermus, vii. 385; xvi. 568.
pedicellatus, iv. 118.
semierectus, ix. 146; xxiv. 153, 229.
tomentosus, xxiv. 151.
truxillensis, xxiv. 153.
Pherotrichis Balbisii, vi. 319.
leptogenia, vi. 319.
Schaffneri, vi. 319.
Philibertia cynanchoides, var. **subtruncata**, viii. 119.
Phoradendron, xxiv. 133, 238.
brachystachyum, x. 36.
florianum, xxiv. 133, 227.
Forestierae, x. 36.
galapageium, xxiv. 133, 227.
Henslovii, xxiv. 133, 227.
uncinatum, xxiv. 134, 227.
Phragmicoma galapagana, xxiv. 101.
nigrescens, xxiv. 101.
Phyllanthus, xxiv. 169.
adenodiscus, vii. 393.
carolinensis, xxiv. 169, 231.
caroliniensis, ix. 148; xxiv. 169.
glaucescens, vii. 393.
laxiflorus, vi. 393.
obovatus, ix. 148; xxiv. 169.
subcuneatus, xiv. 478.
tequilensis, vii. 392.
Physalis, i. 172; xxiv. 200.
acuminata, xviii. 311.
aequata, xxiv. 200.
angulata, ix. 147; xxiv. 200, 234.
arenicola, xix. 568.
foetens, xviii. 312.
geniculata, vii. 390.
glabra, vii. 390.
glutinosa, xviii. 311, 312.
ixocarpa, xxiv. 200, 234.
leptophylla, vii. 389.
minutiflora, vii. 390.
philadelphica, xxi. 502.
philippensis, xix. 568.
Pringlei, xviii. 311, 312; xxi. 502.
puberula, xxi. 502.
pubescens, ix. 147; xxiv. 200, 234.
rotundata, xix. 568.
Rydbergii, xix. 569.
saltillensis, xix. 568.
sordida, xix. 568.
sp., xxiv. 201, 234.
subintegra, xix. 567.
Physcia, xxiv. 85.
leucomela, xxiv. 85.
Physiruellia, xxi. 502.
Phytolacca, xxiv. 141.
decandra, xxiv. 141, 228.
Phytolacca (*continued*).
octandra, xxiv. 141.
Phytolaccaceae, xxiv. 141.
Pilea, xxiv. 133.
Baurii, xxiv. 133, 227.
muscosa, xxiv. 133, 227.
peploides, xxiv. 133, 227.
pubescens, xxiv. 133.
sp., ix. 148; xxiv. 133.
succulenta, xxiv. 133.
Pilotrichella, xxiv. 103.
Anderssonii, xxiv. 103.
nigricans, xxiv. 103.
Pilotrichum asperifolium, xxiv. 261.
Pimpinella **mexicana**, i. 164.
Pinguicula **parvifolia**, vi. 320.
Pink, v. 127.
Deptford, v. 128.
Fire, v. 134.
Maiden, v. 127.
Mullein, v. 152.
Wild, v. 134.
Pinus **Lumholtzii**, viii. 122.
Piperaceae, xxiv. 131, 243, 245.
Piptadenia, xxiv. 152.
Piptothrix **Goldmanii**, xviii. 328.
Piqueria **laxiflora**, iii. 107.
pilosa, iii. 107.
Pringlei, iii. 107, 115.
pyramidalis, xx. 475.
serrata, var. **angustifolia**, ix. 151.
Piscidia, xxiv. 153.
Erythrina, xxiv. 153, 229.
Pisonia, xxiv. 143.
floribunda, xxiv. 143, 228.
Pithecoctenium, xiv. 486; xvi. 572.
buccinatorium, xiv. 572.
cinereum, xiv. 487.
laxiflorum, xiv. 486.
Plagiochasma, xxiv. 101.
Plagiochila, xxiv. 101.
Anderssonii, xxiv. 101, 241, 261.
spinifera, xxiv. 101.
Plagiogramma spinosum, xxiv. 90.
Plantaginaceae, xxiv. 204.
Plantago, xxiv. 204.
major, xxiv. 204, 234.
tomentosa, xxiv. 185.
var., xxiv. 234.
" pumila, xxiv. 204.
Platanus **glabrata**, xxi. 493.
Lindeniana, xxi. 493.
Platylejeunea **pogonoptera**, xxiv. 261.
Platyptera, xvi. 535.
Platypteris, xvi. 534, 536, 537.
crocata, xvi. 538.
Pleopeltis aurea, xxiv. 111.
ensifolia, xxiv. 112.

Pleopeltis (*continued*).
lanceolata, xxiv. 112.
lepidota, xxiv. 112.
macrocarpa, xxiv. 112.
sp., xxiv. 113.
Pleuridium crassifolium, xxiv. 112.
Pleuropetalum, xxiv. 137.
costaricense, xxiv. 137.
Darwinii, xxiv. 137, 228, 244.
Plocamium, xxiv. 99.
coccineum, xxiv. 99.
Plumbaginaceae, xxiv. 185.
Plumbago, xxiv. 185, 204.
scandens, ix. 147; xxiv. 185, 232.
tomentosa, xxiv. 185.
Poa ciliaris, xxiv. 120.
megastachya, ix. 149; xxiv. 120.
pilosa, xxiv. 120.
Pochate, viii. 114.
Poinciana, ii. 168.
pulcherrima, xxiv. 148.
Poinsettia, xiv. 481.
Poiretia, xi. 283.
Polycarpaea, v. 155.
Polycarpeae, v. 124, 126; vi. 275.
Polycarpon, v. 126, 154.
depressum, v. 154.
stipulicidum, v. 155.
tetraphyllum, v. 154.
Polygala, xxiv. 160.
Anderssonii, xxiv. 160, 230.
chathamensis, xxiv. 160.
galapageia, ix. 145; xxiv. 160, 161, 230.
forma angustifolia, xxiv. 161.
" latifolia, xxiv. 161.
var. **insularis**, xxiv. 161, 230.
galapageja, xxiv. 160.
galopagensis, xxiv. 160.
insularis, ix. 145; xxiv. 160, 161.
michoacana, iii. 103.
obovata, ix. 145; xxiv. 161.
forma latifolia, ix. 145.
puberula, ix. 145; xxiv. 160.
var. **ovalis**, vii. 382.
scoparia, iii. 104.
Polygalaceae, xxiv. 160, 243.
Polygonaceae, xxiv. 134, 243.
Polygonum, xxiv. 134.
acuminatum, xxiv. 134, 227.
galapagense, xxiv. 134, 227.
Meisnerianum, xviii. 324.
var. **jalapense**, xviii. 324.
Polymeris, xix. 569, 570.
Polymnia, xxv. 100.
edulis, xxv. 100.
grandis, xvi. 520.
Liebmannii, xxv. 100.
Polymnia (*continued*).
Nelsonii, xxv. 99.
oaxacana, xxv. 99.
Polypodium, xxiv. 111, 114, 251.
angustifolium, xxiv. 111, 225.
aureum, xxiv. 111, 225, 241, 261.
Berteroanum, xxiv. 110.
chnoodes, xxiv. 262.
coriaceum, xxiv. 106, 112.
crassifolium, xxiv. 112, 225.
cuspidatum, xxiv. 113.
ensifolium, xxiv. 111.
incanum, xxiv. 112, 225.
incisum, xxiv. 112.
lanceolatum, xxiv. 112, 225, 241, 262.
lepidopteris, xxiv. 112, 225.
lepidotum, xxiv. 112.
loriceum, xxiv. 112, 225.
macrocarpum, xxiv. 112.
paleaceum, xxiv. 112. 113, 225.
paradiseae, ix. 149; xxiv. 113.
pectinatum, xxiv. 113, 225.
percussum, xxiv. 113, 225.
Phyllitidis, xxiv. 113, 225, 241, 262.
pleiosoros, xxiv. 113.
pleiosorum, xxiv. 113, 225.
prasinum, xxiv. 113.
punctatum, xxiv. 113.
punctulatum, xxiv. 112.
rude, xxiv. 113, 225.
sp., xxiv. 114, 225.
squamatum, ix. 149; xxiv. 113, 225.
tridens, xxiv. 113.
villosum, xxiv. 110.
Polyporus, xxiv. 83.
Polystichum coriaceum, xxiv. 106.
Porophyllum, x. 31; xxiv. 215.
amplexicaule, x. 32.
brachypodum, xviii. 341.
calcicola, xxv. 116.
coloratum, x. 33.
crassifolium, x. 33.
decumbens, x. 32.
ellipticum, ix. 147; x. 31; xxiv. 215, 235, 237.
Ervendbergii, ii. 178; x. 31.
filifolium, x. 33.
gracile, x. 33.
jorullense, x. 32.
Linaria, x. 33.
Lindenii, x. 31.
macrocephalum, x. 31.
n. sp., x. 33.
Nelsonii, x. 32.
nummularium, x. 31.
nutans, x. 31.

Porophyllum (*continued*).
obtusifolium, x. 32; xviii. 342.
Palmeri, x. 32.
pausodynum, x. 32.
Pringlei, ii. 178; x. 32; xxv. 116.
ruderale, x. 31; xxiv. 215.
scoparium, x. 32.
Seemannii, x. 32, 33.
var., x. 33.
tagetoides, x. 33.
tridentatum, x. 33.
viridiflorum, x. 31.
Portlandia pterosperma, xiv. 488.
Portulaca, xxiv. 135.
oleracea, xxiv. 145, 228.
parvifolia, xxiv. 145.
Portulacastrum, xxiv. 144.
sp., xxiv. 145, 228.
Portulacaceae, xxiv. 145.
Potamogeton, xxiv. 115.
pectinatus, xxiv. 115, 225.
Vaillantii, xxiv. 116.
zosteraceus, xxiv. 116.
Potamogetonaceae, xxiv. 115.
Potentilla palustris, xxiii. 184.
Pouzolzia nivea, xiv. 476.
Pringlei, xiv. 476.
Priestleya longifolia. xvi. 519.
Prosopis, xxiv. 153.
dulcis. ix. 146; xxiv. 153, 229.
Pseudagrostemma, v. 152.
Pseudocyphellaria, xxiv. 86.
aurata, xxiv. 86.
Pseudomontanoa, xvi. 535, 558.
Pseudotridax, x. 10.
Psidium, xxiv. 182.
galapageium, xxiv. 182, 232.
galapagejum. xxiv. 182.
Psychotria, xxiv. 207.
angustata, ix. 146; xxiv. 185, 207, 234.
rufipes, ix. 146; xxiv. 207, 234.
sp., xxiv. 207.
Pteris, xxiv. 114.
aculeata. xxiv. 115.
aquilina, var. caudata, ix. 149; xxiv. 114.
var. esculenta, xxiv. 114, 225.
esculenta, xxiv. 114.
geraniifolia, xxiv. 111.
incisa, xxiv. 111, 225.
lutea, xxiv. 111.
pallida. xxiv. 114.
pedata. ix. 149; xxiv. 111, 114, 225.
propinqua. var. Cumingiana, xxiv. 115, 225.
Pterophyton, xvi. 534, 535, 539; xxv. 113.
Ptilostephium, x. 3.
coronopifolium, x. 9.
Galeottii, x. 8.
trifidum, x. 9.
Pycnosphace, xix. 553.
Pycreus polystachyus, xxiv. 127.
Pyrenula, xxiv. 86.
aurantiaca, xxiv. 86.
cerina, xxiv. 84, 86.
Pyrola minor, xxiii. 184.

Quercus, xxiii. 189.

Radula, xxiv. 101.
retroflexa, xxiv. 101.
Ragged Robin, v. 151.
Ramalina, xxiv. 86.
complanata, xxiv. 86.
indica, xxiv. 86.
sp., ix. 149.
usneoides, ix. 149; xxiv. 86, 88.
Randia, xii. 93.
canescens, xvi. 573.
Nelsonii, xvi. 574.
Pringlei, xvi. 574.
tomentosa, vi. 317.
Watsoni, vi. 317.
Ranunculus geoides, iv. 116.
Hookeri, iv. 116.
Raphanus, xxiv. 146.
sativus, xxiv. 146, 228, 238.
Ratibida columnaris, var. pulcherrima, xvi. 576.
Rauwolfia glabra, xxiv. 185.
Red Campion, v. 151.
Cottongrass, xv. 199.
Lychnis, v. 151.
Relbunium, xiv. 455, 456, 467; xxiv. 207.
Aschenbornii, xiv. 470.
ciliatum, xiv, 469, 470.
hirsutum, xiv. 469.
humile, xiv. 468.
hypocarpium, xiv. 466–468.
hypocarpum, xiv. 468.
laevigatum, xiv. 468.
microphyllum, xiv. 469, 470.
var. **hispidulum**, xiv. 470.
" **setulosum**, xiv. 470.
polyplocum, xiv. 470.
sp., xxiv. 207, 234.
sphagnophilum, xiv. 470.
Rhamnaceae, xxiv. 171, 172.
Rhaphidospora, i. 174.
Rhizoclonium, xxiv. 89.
Hookeri, xxiv. 89, 90.
Rhizogonium spiniforme, xxiv. 261.
Rhizophora, xxiv. 182, 194.
Mangle, xxiv. 182, 232, 237, 247.

Rhizophoraceae, xxiv. 182.
Rhodochlamys speciosa, xix. 532.
Rhodophyceae, xxiv. 93.
Rhodymenia, xxiv. 99.
flabellifolia, xxiv. 99.
Rhynchosia, xxiv. 154, 237.
aureo-guttata, xxiv. 154.
exigua, xxiv. 154.
minima, ix. 146; xxiv. 154, 229.
punctata, xxiv. 154.
reticulata, xxiv. 154, 229.
Senna, xxiv. 79, 261.
sp., xxiv. 154, 229.
Rhynchospora aristata, xxv. 70.
aurea, xxv. 70.
Pringlei, xxv. 69.
Ribes campanulatum, xxv. 79.
ciliatum, xxv. 79.
Dugesii, xxv. 78, 79.
jorullense, xxv. 79.
viscosissimum, xxv. 79.
Riccia, xxiv. 101.
Ricinus, xxiv. 170.
communis, xxiv. 170, 231, 241.
Rinodina, xxiv. 87.
mamillana, xxiv. 83, 87.
Robin, Ragged, v. 151.
Roccella, xxiv. 87, 88.
fuciformis, ix. 149; xxiv. 87.
intricata, ix. 149; xxiv. 88.
Montagnei, var. peruensis, xxiv. 87.
peruensis, xxiv. 87, 88.
phycopsis, xxiv. 88.
portentosa, xxiv. 87.
tinctoria, xxiv. 87, 88.
forma dichotoma, xxiv. 88.
var. portentosa, xxiv. 85.
Roccellaria, xxiv. 87, 88.
Rolandra argentea, xxiv. 263.
Rondeletia leucophylla, var. **calycosa**, xxv. 92.
Rosaceae, xxiv. 146, 242.
Round-leaved Catchfly, v. 135.
Royal Catchfly, v. 135.
Rubia acuminata, xiv. 466.
ciliata, xiv. 469.
hypocarpia, xiv. 468.
laevigata, xiv. 468.
Relbun, xxiv. 207.
sp., xxiv. 207.
Rubiaceae, xxiv. 204, 241, 243, 248, 251.
Rubicaules, xiii. 306.
Rudbeckia Porteri, xvii. 91.
Rudes, xix. 529.
Ruellia **albiflora**, xii. 92.
Bourgaei, i. 173.
cupheoides, xxi. 502.
dipteracanthus, xvi. 573.
Ruellia (*continued*).
malacosperma, xvi. 572.
ovalifolia, xvi. 573.
tuberosa, xvi. 573.
Rumex persicarioides, xxiii. 184.
Rumfordia, xxv. 100.
polymnioides, xxv. 99.
Ruppia, xxiv. 116.
maritima, xxiv. 116, 225, 237.
Ruprechtia Cumingii, xii. 87.
fusca, xii. 86; xiv. 477.
Pringlei, xiv. 476.
Russelia, xviii. 315, 319.
alata, xviii. 319.
Deamii, xx. 474.
equisetiformis, xviii. 319.
floribunda, xviii. 320.
jaliscensis, xviii. 319; xx. 474.
juncea, xviii. 319.
multiflora, xviii. 321.
paniculata, xviii. 321.
polyedra, xviii. 320; xx. 474.
retrorsa, xviii. 320.
rotundifolia, xviii. 321.
sarmentosa, xviii. 320, 321; xx. 474.
subcoriacea, iii. 113; xviii. 319.
syringaefolia, xviii. 320.
tepicensis, xviii. 321.
ternifolia, xviii. 320.
trachypleura, xx. 474.
verticillata, xviii. 320.
Rutaceae, xxiv. 158.
Rutilaria recens, xxiv. 90.

Sabazia, x. 22; xviii. 316.
glabra, xviii. 316.
Liebmanni, ii. 174.
michoacana, ii. 173.
sarmentosa, x. 22.
subnuda, iii. 108.
Sabbatia **arenicola**, xvi. 569.
campestris, xvi. 569.
Sagina, v. 152; vi. 275, 306.
apetala, vi. 306, 307.
crassicaulis, vi. 308.
decumbens, vi. 306, 307.
var. Smithii, vi. 307.
Elliottii, vi. 307.
erecta, vi. 281.
fontinalis, vi. 286.
intermedia, vi. 308.
Linnaei, vi. 307.
maxima, vi. 308.
nivalis, vi. 308.
nodosa, vi. 308.
occidentalis, vi. 307.
procumbens, vi. 307.
var., vi. 306.

Sagina (*continued*).
saxatilis, vi. 308.
subulata, vi. 307.
var. Smithii, vi. 307.
Salices, xxiii. 169.
Salix, xxiii. 168, 189; xxiv. 77.
Salmea Eupatoria, xvi. 566.
Salvia, xiv. 485; xix. 489; xxiv. 197, 238.
adenophora, xix. 538.
adglutinans, xix. 532.
aegyptiaca, xix. 503.
aequidistans, xix. 512.
affinis, xix. 546.
ageratifolia, xxi. 499.
alamosana, xix. 525.
albicans, xxi. 501.
albiflora, xix. 515.
forma caerulescens, xix. 515.
var. caerulescens, xix. 510, 515.
albo-caerulea, xix. 541.
aliena, xiv. 485; xix. 513.
alvajaca, xix. 516.
amara, xix. 528.
amarissima, xix. 528, 529.
amethystina, xix. 528.
angustifolia, xix. 499–501.
var. glabra, xix. 500, 502.
antennifera, xix. 545.
aristulata, xix. 551.
aspera, xix. 531, 537.
aspidophylla, xix. 503.
assurgens, xix. 500, 504.
atriplicifolia, xix. 553.
axillaris, xix. 519.
azurea, xix. 491, 500.
ballotaeflora, xix. 522.
var. **Eulaliae**, xix. 522.
" **pinguifolia**, xix. 523.
bella, xix. 545.
Betonica, xix. 507.
bicolor, xix. 529, 530.
biserrata, xix. 544.
Boucheana, xix. 538.
brachyodonta, xix. 510; xxi. 500.
bracteata, xix. 499.
brevicalyx, xix. 509.
breviflora, xix. 522.
bullata, xix. 493.
bupleuroides, xix. 497.
cacaliaefolia, xix. 552.
caesia, xix. 512.
californica, xix. 554.
candicans, xix. 520.
cardinalis, xix. 537.
Cataria, xix. 510.
cedrosensis, xix. 499, 521.
chamaedrifolia, xix. 521.

Salvia (*continued*).
chamaedryoides, xix. 519–521.
var. **isochroma**, xix. 522.
Chamaedrys, xix. 521.
chapalensis, xix. 525.
Chia, xix. 495, 503.
chiapensis, xix. 544.
chrysantha, xix. 531.
ciliaris, xix. 499.
ciliata, xix. 499, 550.
cinnabarina, xix. 544, 549.
circinata, xix. 528.
cladodes, xix. 497.
clinopodioides, iii. 114; xix. 530.
coahuilensis, xix. 520.
coccinea, xix. 550, 551.
var. **minima**, xix. 551.
" pseudo-coccinea, xix. 550.
Columbariae, xix. 553.
comosa, xix. 501, 503.
var. **hypoglauca**, xix. 501.
concolor, xix. 543.
confinis, xix. 523.
Conzattii, xix. 526.
cordobensis, xix. 514.
costaricensis, xix. 496.
Coulteri, xix. 519.
crenata, xix. 533.
cryptanthos, xix. 499.
cryptodonta, xix. 507.
cuneifolia, xix. 519.
curviflora, xix. 544, 546.
cyanea, xix. 528, 544.
cyanifera, xix. 544.
cyaniflora, xix. 544.
cyclophylla, xix. 551.
decipiens, xix. 552.
deltoidea, xix. 533.
dichroma, xix. 491.
disjuncta, xix. 533.
dominica, xix. 493.
Dugesii, xxi. 500.
Durandiana, xix. 511.
elegans, xix. 544, 549.
var. **sonorensis**, xix. 550.
elongata, xix. 507.
elsholtzioides, xix. 498.
excelsa, xix. 548.
fatuosa, xix. 532.
filipes, xix. 510.
fimbriata, xix. 494.
firma, xix. 502.
flaccida, xix. 499, 509.
flexuosa, xix. 495, 516.
fluviatilis, xix. 516.
Forreri, xix. 518.
fruticulosa, xix. 526.
fulgens, xix. 537, 539.

Salvia, fulgens (*continued*).
var. Boucheana, xix. 536, 538.
Galeottii, xix. 550.
galinsogifolia, xix. 498.
Ghiesbreghtii, xix. 511; xxi. 500.
glabra, xix. 513.
glabrata, xix. 543.
glaucescens, xix. 550.
glechomaefolia, xix. 501, 502, 504, 518.
glumacea, xix. 552.
glutinosa, xix. 552.
Goldmanii, xix. 527.
Gonzalezii, xix. 524.
graciliflora, xix. 546.
gracilis, xix. 513.
Grahami, xix. 533.
grandiflora, xix. 537, 552.
Greggii, xix. 537.
guadalajarensis, xix. 506.
helianthemifolia, xix. 506, 507.
var., xix. 506.
herbacea, xix. 513.
heterotricha, xix. 499, 500.
var. **multinervia**, xix, 501.
hirsuta, xix. 499, 528.
hirta, xix. 523.
hispanica, xix. 504, 508.
Humboldtiana, xix. 505.
humilis, xix. 495.
hypoglauca, xix. 501.
hyptoides, xix. 497, 498.
var. **subspicata**, xix. 498.
ianthina, xix. 543.
igualensis, xxi. 500.
incana, xix. 551.
incarnata, xix. 549.
inconspicua, xix. 492.
involucrata, xix. 539, 540.
iodantha, xix. 547.
iodochroa, xix. 540.
irazuensis, xix. 540.
jaliscana, xix. 515.
Jurgensenii, xix. 514.
Karwinskii, xix. 548.
Keerlii, xix. 528.
laevigata, xix. 539.
laevis, xix. 502.
lanceifolia, xix. 503.
lanceolata, xix. 503, 504.
lantanaefolia, xix. 530.
lasiantha, xix. 524; xxi. 500.
lasiocephala, xix. 498.
lateriflora, xix. 494.
lavendulaefolia, xix. 505.
lavenduloides, xix. 505, 507.
var. latifolia, xix. 506.
laxa, xix. 522.
Salvia (*continued*).
Lemmoni, xix. 535.
Leonia, xix. 553.
leptophylla, xix. 500.
leptostachys, xix. 511.
leucantha, xix. 529.
forma **iobaphes**, xxi. 501.
Lindenii, xix. 537.
linearifolia, xix. 511.
lineata, xix. 539.
linifolia, xix. 500.
Littae, ix. 163; xix. 547.
longiflora, xix. 545, 549.
longispicata, xix. 513.
longistyla, xix. 551.
lophantha, xix. 496.
lophanthoides, xix. 499.
lupulina, xix. 542.
lycioides, xix. 521.
macrantha, xix. 552.
madrensis, xix. 532.
Martensii, xix. 508, 528, 541.
mazatlanensis, xix. 515.
mellissifolia, xix. 542.
melissodora, xix. 523.
membranacea, xix. 513.
var. villosa. xix. 541.
menthiformis, xix. 510.
mexicana, xix. 542.
var. major, xix. 542.
" minor, xix. 542.
michoacana, xix. 548.
micrantha, xix. 493; xxi. 499.
microcalyx, xix. 549.
microculis, xix. 549.
microphylla, xix. 534, 535, 537.
var. canescens, xix. 534.
" Wislizeni, xix. 534.
miniata, xix. 545.
misella, xix. 492.
Mocinoi, xix. 496.
mollissima, xix. 550.
monclovensis, xix. 514.
monochila, xix. 548.
multiramea, xix. 525.
muscarioides, xix. 506.
nana, xix. 508.
negla, xix. 533.
Nelsonii, xix. 527.
neo-hispanica, xix. 508.
nepetifolia, xix. 499.
nepetoides, xix. 529.
nervata, xix. 544, 548.
neurepia, xix. 535.
nitida, xix. 497, 498.
nitidifolia, xix. 542.
oaxacana, xix. 536.
oblongifolia, xix. 505.

Salvia (*continued*).
obscura, xix. 492.
obtusa, xix. 536.
occidentalis, ix. 147; xix. 491–493; xxiv. 197, 233.
var. Garberi, xix. 492.
orbicularis, xix. 493.
oreopola, xix. 517.
oresbia, xix. 536.
orizabensis, xix. 538.
Ottonis, xix. 551.
ourophylla, xix. 495.
Palmeri, xix. 511.
pansamalensis, xix. 541.
papilionacea, xix. 542.
parquerensis, xix. 530.
patens, xix. 552.
patzcuarensis, xix. 531.
pauciflora, xix. 522.
perlonga, xix. 546.
permixta, xix. 496.
phaenostemma, xix. 542.
phlomoides, xix. 499.
Pittieri, xix. 530.
platycheila, xix. 523.
platyphylla, xix. 529.
podadena, xix. 492.
polystachya, xix. 510, 511, 513.
var., xix. 510.
" **albicans**, xix. 512.
" caesia, xix. 511.
" **philippensis**, xix. 512.
" potosina, xix. 512.
" **seorsa**, xix. 512.
pomifera, xix. 522.
populifolia, xix. 529, 530.
porphyrantha, xix. 553.
porphyrata, xix. 553.
prasiifolia, xix. 513.
Pringlei, vii. 391; xix. 539.
prismatica, xix. 508.
privoides, xix. 492–494.
procumbens, xix. 491.
prostrata, xxiv. 198, 233.
protracta, xix. 513.
pruinosa, xix. 526.
prunelloides, xix. 504, 505, 508, 517; xxi. 500.
prunifolia, xix. 518.
pseudo-coccinea, xix. 550.
pteroura, xix. 516.
puberula, xix. 539.
pubescens, xix. 532; xxi. 501.
pulchella, xix. 522, 539.
punicea, xix. 549.
purpurascens, xix. 528, 540.
purpurea, xix. 510, 546.
var. pubens, xix. 512, 547.
purpurina, xix. 505.
pusilla, xix. 495.
radicans, xix. 491.
ramosissima, xix. 521.
rectiflora, xix. 537, 551.
recurva, xix. 543.
reflexa, xix. 503.
Regla, xix. 533.
remota, xix. 507.
reptans, xix. 500.
reticulata, xix. 505.
rhombifolia, xix. 508, 517.
Roemeriana, xix. 553.
Roezli, xix. 532.
roscida, xix. 517.
rosea, xix. 550.
Rosei, xix. 548.
rubiginosa, xix. 496.
var. **hebephylla**, xix. 496.
rubropunctata, viii. 121; xix. 527.
saltuensis, xix. 497.
Sanctae-Luciae, xix. 514.
Schaffneri, xix. 535.
Sclarea, xix. 491.
scorodonia, xix. 523, 524.
scorodoniaefolia, xix. 521, 523, 528.
var. **crenaea**, xix. 524.
Seemannii, xix. 516.
semiatrata, xix. 499, 524.
semperflorens, xix. 532.
serotina, xix. 493.
serpyllifolia, xix. 521.
Sessei, xix. 532; xxi. 501.
sessilifolia, xix. 499, 529.
setosa, xix. 493; xxi. 499.
setulosa, xxi. 499.
Shannoni, xix. 531; xxi. 501.
sidaefolia, xix. 499, 529.
sideritidis, xix. 499.
simplex, xix. 507.
sinaloensis, xix. 502, 503.
spectabilis, xix. 552.
spicata, xix. 522, 523.
stachyoides, xix. 507.
staminea, xix. 552.
stolonifera, xix. 540.
stricta, xix. 505.
subincisa, xix. 503.
Tatei, xix. 505.
Teresae, xix. 506.
tetragona, xix. 508.
thymoides, xix. 520.
thyrsiflora, ix. 163; xix. 523, 525.
tiliaefolia, xix. 494, 504, 541; xxiv. 198, 233.
var. **cinerascens**, xix. 495.
" **rhyacophila**, xxi. 499.

Salvia (*continued*).
Tonduzii, xix. 539.
trichandra, xix. 505.
trichostemoides, xix. 503.
tricolor, xix. 534.
tricuspidata, xix. 513.
tubifera, xix. 545, 548.
tubiformis, xix. 551.
unicostata, xix. 501.
venosa, xix. 545.
veronicaefolia, xix. 517.
villosa, xix. 518.
villosula, xix. 541.
virgata, xix. 500.
vitifolia, ix. 163; xix. 552.
Wagneriana, xix. 532.
Warszewicziana, xix. 514.
xalapensis, xix. 513.
zacualpensis, xix. 545.
Salvinia, xxiv. 115, 237.
sp., xxiv. 115, 225.
Salviniaceae, xxiv. 115.
Sandwort, vi. 289.
Thyme-leaved, vi. 292.
Sanguisorbea, xxiv. 146, 228.
Sanvitaliopsis, x. 14.
Sapindaceae, xxiv. 170, 241, 243.
Sapindus, ix. 145; xxiv. 171.
acuminatus, ix. 145; xxiv. 171.
Saponaria, xxiv. 171, 231.
Saponaria, v. 125, 129.
officinalis, v. 129.
Vaccaria, v. 129.
Saracha grandiflora, ix. 161.
viscosa, xix. 567.
Sarcanthus asperrimus, xxiv. 192.
Sargassum, xxiv. 92.
acinaria, xxiv. 92.
cymosum, xxiv. 92, 93.
galapagense, xxiv. 92, 93.
var. setifolia, xxiv. 92.
graminifolium, xxiv. 92.
lendigerum, xxiv. 93.
var. foliosa, xxiv. 92, 93.
forma rigidiuscula, xxiv. 92.
" subdelicatula, xxiv. 92.
" furcifolia, xxiv. 92, 93.
forma denticulata, xxiv. 92.
piluliferum, xxiv. 92.
Sarotheca, i. 174.
Sarratia urceolata, xxiv. 136.
Saubinetia, xvi. 535, 537, 549.
helianthoides, xvi. 551.
Saxifraga, xxiii. 168.
pennsylvanica, vi. 329.
Scaevola, xxiv. 208.
Lobelia, xxiv. 208, 235, 237.
Plumieri, xxiv. 208.
Scalesia, xxiv. 216, 218, 242, 244, 245, 249, 254, 255.
affinis, xxiv. 216, 219, 235.
aspera, xxiv. 216, 235.
atractyloides, xxiv. 216, 235.
Baurii, ix. 141, 146; xxiv. 216, 219, 235, 247.
var. glabrata, xxiv. 216, 235, 247.
Darwinii, ix. 146; xxiv. 216, 236.
decurrens, ix. 146; xxiv. 216, 236.
divisa, xxiv. 217, 236.
gummifera, xxiv. 217, 236, 244.
Helleri, xxiv. 217, 236.
Hopkinsii, xxiv. 217, 219, 236, 243.
incisa, ix. 142; xxiv. 217, 219, 236.
microcephala, xxiv. 218, 236.
n. sp., xxiv. 220, 236.
narbonensis, xxiv. 218, 236.
ovata, xxiv. 219, 236.
pedunculata, xxiv. 219, 236.
retroflexa, xxiv. 217, 219, 236.
Snodgrassii, xxiv. 216, 219, 236, 251.
Schistocarpha, xvi. 522; xxv. 93.
Schizocarpum filiforme, vii. 386.
parviflorum, vii. 386.
Schizophyllum, xxiv. 83.
alneum, xxiv. 83.
commune, xxiv. 83.
Schkuhria abrotinoides, xii. 58.
glomerata, iii. 109; x. 48.
platyphylla, ix. 156; x. 49.
Schlotheimia, xxiv. 104.
Jamesoni, xxiv. 104.
nitida, xxiv. 104.
Schoenocaulon officinale, ix. 168.
Pringlei, xi. 295.
tenuifolium, ix. 168.
Schrankia brachycarpa, xiii. 330.
elata, xiii. 329.
Schrankioideae, xiii. 306.
Scirpus, xv. 498, 499; xxii. 495.
annuus, xv. 494.
atrocinctus, xv. 502.
var. brachypodus, xv. 503.
capillaris, xxiv. 129.
capitatus, xv. 492, 494.
compressus, xv. 494.
cyperinus, xv. 501.
var. Eriophorum, xv. 500, 502.
elegantulus, xv. 492.
Eriophorum, xv. 498–500, 502.
α, xv. 500.
β, xv. 501.
γ, xv. 500.
ζ, xv. 501.
η, xv. 499, 502.

Scirpus Eriophorum (*continued*).
var. **Andrewsii**, xv. 501.
" **condensatus**, xv. 501.
" cyperinus, xv. 499–501.
" laxus, xv. 500, 502.
eriophorus, xv. 500.
micranthus, xxiv. 130.
multicaulis, xv. 494.
mutatus, xxiv. 129.
nutans, xv. 494.
obtusus, xv. 485, 492.
ovatus, xv. 492, 494.
soloniensis, xv. 494.
thyrsiflorus, xv. 500.
turgidus, xv. 494.
Sclarea mexicana, xix. 542.
Scleria, xxiv. 130, 237.
lithosperma, var. filiformis, xii. 86.
pratensis, ix. 148; xxiv. 130, 227.
Sclerocarpus, xx. 466.
africanus, xx. 465.
Schiedeanus, var. **elongatus**, xi. 309.
Scleropus squamulatus, xxiv. 136.
squarrulosus, xxiv. 135.
urceolatus, xxiv. 136.
Sclerothrix, xxiv. 178.
fasciculata, xxiv. 178, 232.
Scoparia, xxiv. 202.
dulcis, ix. 147; xxiv. 202, 234.
Scorodoniae, xix. 519, 523; xxi. 500.
Scrophulariacea, xxiv. 202, 234.
Scrophulariaceae, xxiv. 202.
Scutellaria **aurea**, ix. 163.
distans, xix. 562.
Drummondii, i. 175.
galericulata, xix. 563.
hispidula, i. 174.
laterifolia, xix. 494.
Mociniana, xix. 563.
Pedicularis, xix. 563.
Rosei, xix. 563.
Wrightii, i. 175.
Scytonema, xxiv. 89.
Myochrous, xxiv. 89.
Seala, xii. 58, 66.
Sebestenoides, xxi. 498.
Sedum Bourgaei, ix. 151.
calcicola, ix. 150.
guatemalense, ix. 151.
Lumholtzii, viii. 116.
napiferum, iii. 105.
Pringlei, var. **minus**, iii. 105.
Selaginella stenophylla, xxiv. 262.
Selineae, ii. 168, 169.
Senebiera, xxiv. 146.
didyma, xxiv. 146.
pinnatifida, xxiv. 146, 228.
Senecio, xviii. 335; xxv. 94.
abietinus, xxv. 119.
alienus, iii. 110.
eriocephalus, xxv. 94.
firmipes, xxv. 119.
glacialis, xxv. 119.
gracilipes, ix. 156.
guadalajarensis, i. 166.
jaliscana, iii. 110.
orizabensis, iv. 121.
prionopterus, x. 49.
procumbens, iii. 115.
pterocaulis, xxv. 119.
pulchellus, xxv. 119.
reticulatus, ix. 157; xi. 311.
vernicosus, var. major, xxv. 119.
Sensitivae, xiii. 306, 308; xviii. 325.
Sesuvium, xxiv. 144.
Edmonstonei, ix. 146; xxiv. 144, 228, 237.
Portulacastrum, xxiv. 144, 228, 237.
var. revolutum, xxiv. 144.
Setaria, xxiv. 124.
antillarum, ix. 148; xxiv. 124.
caudata, xxiv. 124.
floriana, xxiv. 124, 226.
n. sp., xxiv. 125.
Rottleri, xxiv. 124.
setosa, xxiv. 124, 226.
sp., xxiv. 226.
Seymeria **integrifolia**, xxv. 89.
Sicyos, xxiv. 208, 237.
collinus, viii. 116.
Deppei, viii. 116.
villosus, xxiv. 208, 235.
Sida, xxiv. 174.
acuta, var. carpinifolia, xxiv. 174, 231.
angustifolia, xxiv. 175, 231.
atrosanguinea, xxiv. 175.
carpinifolia, xxiv. 174.
caudatifolia, viii. 382.
cordifolia, xxiv. 175, 231.
depauperata, xxiv. 173.
floribunda, xxiv. 175.
humilis, xxiv. 176.
paniculata, ix. 145; xxiv. 175, 231.
rhombifolia, ix. 145; xxiv. 175, 231.
spinosa, xxiv. 175, 231.
var. angustifolia, xxiv. 175.
tenuicaulis, xxiv. 175.
veronicaefolia, var. humilis, xxiv. 176, 231.
viscosa, xxiv. 173.
Siegesbeckia **repens**, ix. 153.
Silene, v. 124, 125, 130, 147.
acaulis, v. 132.
alba, v. 133.

Silene (*continued*).
anglica, v. 130.
antirrhina, v. 132.
var. **divaricata**, v. 132.
" linaria, v. 132.
Armeria, v. 132.
Baldwinii, v. 134.
Bernardina, v. 142.
Bolanderi, v. 137.
Bridgesii, v. 139.
californica, v. 136.
var. **subcordata**, v. 136.
campanulata, v. 137.
var. **Greenei**, v. 137.
caroliniana, v. 134.
Catesbaei, v. 135.
cheiranthoides, v. 134.
coccinea, v. 135.
conoidea, v. 131.
Cucubalus, v. 133.
dichotoma, v. 131.
forma racemosa, v. 131.
Dorrii, v. 138.
Douglasii, v. 144.
var. **brachycalyx**, v. 145.
" **Macounii**, v. 144.
" **macrocalyx**, v. 145.
" **monantha**, v. 145.
" **multicaulis**, v. 144.
" **viscida**, v. 145.
Drummondii, v. 144, 146, 148.
Engelmanni, v. 139.
var. Behrii, v. 141.
fimbriata, v. 134.
gallica, v. 130, 131.
var. quinquevulnera, v. 130.
Gravii, v. 143.
Greggii, v. 136; vi. 328.
Hallii, v. 145, 148.
Hookeri, v. 137.
incarnata, v. 134.
incompta, v. 139.
inflata, v. 133.
laciniata, v. 135; vi. 328.
var. californica, v. 136.
" Greggii, v. 136.
Lemmoni, v. 138.
longistylis, v. 138.
luisana, v. 141.
lusitanica, v. 130.
Lyallii, v. 143, 144.
Macounii, v. 145.
Menziesii, v. 137.
monantha, v. 145.
montana, v. 140.
var. **rigidula**, v. 140.
multicaulis, v. 144, 145.
multinervia, v. 131.
Silene (*continued*).
nivea, v. 133.
noctiflora, v. 131.
nocturna, v. 131.
nutans, v. 134.
occidentalis, v. 140.
oregana, v. 140.
ovata, v. 133.
Palmeri, v. 138.
Parishii, v. 135, 137; vi. 328.
pectinata, v. 139.
var. **subnuda**, v. 140.
pennsylvanica, v. 134.
platyota, v. 141.
platypetala, v. 134.
plicata, v. 139.
Pringlei, v. 146.
pulchra, v. 136.
purpurata, v. 141.
quinquevulnera, v. 130.
racemosa, v. 131.
regia, v. 135; vi. 328.
rotundifolia, v. 135.
rubicunda, v. 134.
Sargentii, v. 142.
scaposa, v. 145.
Scouleri, v. 141, 146, 148.
Shockleyi, v. 140.
simulans, v. 136.
Spaldingii, v. 146.
speciosa, v. 136.
stellarioides, v. 138.
stellata, v. 133.
subciliata, vi. 327.
Suksdorfii, v. 143.
Thurberi, v. 139.
Tilingi, v. 136.
verecunda, v. 141.
virginica, v. 134–136; vi. 328.
Watsoni, v. 143.
Wrightii, v. 136.
Sileneae, v. 124; vi. 274.
Silphium terebinthinaceum, ix. 158.
Simarubaceae, xxiv. 158, 243.
Sinapis arvensis, xxiv. 146.
Sinclairia discolor, xi. 293.
Sisymbrium Coulteri, xvi. 568.
Sisyrinchium alatum, var. **angustissimum**, ix. 166.
angustifolium, xxv. 76.
bracteatum, xxv. 74.
exalatum, ix. 166.
Hartwegi, xxv. 75.
form, xxv. 75.
Palmeri, xxv. 75.
polycladum, ix. 166.
Pringlei, vii. 394.
quadrangulatum, xxv. 75, 76.

Sisyrinchium (*continued*).
scabrum, var. exaltatum, xxv. 75.
tenuifolium, xxv. 75.
var. Seatoni, xxv. 76.
Sleepy Catchfly, v. 132.
Smilax domingensis, var. microscola, xviii. 323.
erythrocarpa, xvi. 567.
Pringlei, xvi. 567.
Snapdragon Catchfly, v. 132.
Soapwort, v. 129.
Sogalgina, x. 3.
balbisioides, x. 5.
trilobata, x. 5.
Solanacea, x. 147; xxiv. 201.
sp., ix. 142.
Solanaceae, xix. 562; xxiv. 198, 241, 243.
Solanum, xix. 557; xxiv. 201.
amazonium, xix. 571.
amictum, xix. 562.
azureum, xix. 570.
Berterii, xxiv. 201.
boerhaviaefolium, xvi. 571.
capsicastrum, xvi. 571.
chrysotrichum, xix. 561, 562.
deflexum, xi. 301.
dejectum, xix. 569.
diversifolium, xix. 558, 560.
Edmonstonei, xxiv. 201, 234.
erythrotrichum, xix. 561.
Fendleri, xix. 559.
Hartwegi, xix. 559.
Hayesii, xix. 560.
Hernandezii, xix. 558.
hispidum, xix. 561.
jaliscanum, xvi. 571.
jasminifolium, xvi. 571.
Lamberti, xix. 562.
lentum, xix. 570.
lignescens, xii. 91; xvi. 571.
macroscolum, xix. 570.
madrense, xix. 558.
marginatum, xiv. 486.
mitlense, xi. 302.
nigrum, ix. 147; xi. 302; xxiv. 201, 234.
nocturnum, xix. 570.
obtusifolium, xix. 560, 571.
ochraceo-ferrugineum, xix. 557, 560.
pimpinellifolium, xxiv. 200.
plumense, xix. 569.
polyadenium, xxv. 89.
Pringlei, ix. 160.
rostratum, xix. 570.
var. subintegrum, xxi. 502.
rude-pannum, xix. 562.
somniculentum, xix. 570.
Solanum (*continued*).
sp., xxiv. 201, 234.
stellatum, xix. 561.
torvum, xix. 557, 558.
var. lanatum, xix. 359.
" ochraceo-ferrugineum, xix. 560.
" rubiginosum, xix. 558.
tuberosum, xxiv. 201.
validum, xvi. 571.
verbascifolium, xxiv. 201, 234.
Solidago Pringlei, xxi. 505.
rupestris, xxi. 505.
Sonchus, xxiv. 220.
asper, x. 51.
oleraceus, xxiv. 220, 236.
Sonoricola, xvi. 535, 542.
Spatoglossum, xxiv. 93.
Schroederi, xxiv. 93.
Spergula, vi. 275, 309, 313.
arvensis, vi. 313.
decumbens, vi. 307.
fontinalis, vi. 286.
nodosa, vi. 307, 309.
ramosissima, vi. 313.
rubra, vi. 310.
saginoides, vi. 307, 308.
subulata, vi. 307.
Spergularia, vi. 274, 275, 309.
borealis, vi. 312.
campestris, vi. 310.
canadensis, vi. 311, 312.
Clevelandi, vi. 310.
diandra, vi. 310, 311.
gracilis, vi. 311.
macrotheca, vi. 312.
var. leucantha, vi. 313.
" scariosa, vi. 313.
media, vi. 311.
var. macrocarpa, vi. 311.
rubra, vi. 309, 310, 313.
var. campestris, vi. 310.
" marina, vi. 311.
salina, vi. 311, 312.
var. minor, vi. 312.
tenuis, vi. 311, 312.
villosa, vi. 310.
Spergulastrum, vi. 281.
gramineum, vi. 283.
lanceolatum, vi. 285, 286.
lanuginosum, vi. 293.
Spermacoce, xxiv. 207.
asperifolia, ix. 146; xxiv. 206.
Baurii, ix. 141; xxiv. 204.
galapageia, ix. 141; xxiv. 205.
megalocarpa, ii. 169.
pacifica, ix. 141; xxiv. 205.
tenuior, ix. 146; xxiv, 207, 234.

Sphaeria gregaria, xxiv. 84.
Sphaerococcus canaliculatus, xxiv. 94.
filiformis, xxiv. 99.
flabellifolius, xxiv. 99.
Lessonii, xxiv. 96.
Spilanthes, xviii. 316; xxiv. 220.
Acmella, xxiv. 220, 236.
Beccabunga, ii. 176.
var. **parvula**, ii. 176.
crocata, xvi. 537.
diffusa, xxiv. 220, 236.
disciformis, ii. 176.
var. **phaneractis**, xxv. 108.
filipes, xviii. 314.
macrophylla, xxv. 109.
Mutisii, xxv. 109.
ramosa, xviii. 314.
sessilifolia, xviii. 317.
sessilis, xviii. 317.
urens, xxv. 109.
Spiranthes aurantiaca, var. **acuminata**, iii. 115.
eriophora, ix. 165.
Nelsonii, xviii. 307.
oaxacana, x. 34.
Pringlei, var. **minor**, xviii. 307.
rubrocalosa, ix. 165.
tenuiflora, xviii. 308.
velata, viii. 122.
Spondias Edmonstonei, ix. 145; xxiv. 159.
Sporobolus, xxiv. 125.
domingensis, xxiv. 125, 226.
indicus, xxiv. 125, 226.
tenacissimus, xxiv. 125.
virginicus, xxiv. 125, 226.
f. elata, xxiv. 126.
" obesa, xxiv. 126.
Spurry, vi. 313.
Stachyotypus, xix. 564.
Stachys agraria, xxv. 88.
aristata, xxv. 87.
coccinea, xix. 564.
Drummondii, xix. 564.
flaccida, xix. 563.
latipes, xxv. 87.
oaxacana, xix. 564.
Stachytarpheta, xxiv. 196.
acuminata, ix. 162.
dichotoma, xxiv. 196, 233.
Nelsonii, ix. 162.
urticifolia, xxiv. 196.
Stammarium, xii. 62, 66.
hyssopifolium, xii. 82.
Starry Campion, v. 133.
Starwort, vi. 281.
Stellaria, vi. 274, 275, 281, 290.
alpestris, vi. 286.
Stellaria (*continued*).
alsine, vi. 285.
aquatica, vi. 281, 285.
biflora, vi. 290, 304.
borealis, vi. 285.
var., vi. 283.
" β, vi. 286.
" **alpestris**, vi. 286.
" apetala, vi. 287.
" corollina, vi. 285, 286.
" crispa, vi. 287.
brachypetala, vi. 286.
calycantha, vi. 285.
cerastoides, vi. 281.
crassifolia, vi. 284–286.
crispa, vi. 287.
cuspidata, vi. 282.
dichotoma, vi. 288, 289.
var. **americana**, vi. 289.
" **cordifolia**, vi. 289.
Edwardsii, vi. 284.
elongata, vi. 293.
Fenzlii, vi. 286.
fontinalis, vi. 286.
glauca, vi. 284.
gracilis, vi. 286.
graminea, vi. 282, 283, 285, 289.
groenlandica, vi. 298.
Holostea, vi. 288.
humifusa, vi. 286, 287.
var. oblongifolia, vi. 287.
" ovalifolia, vi. 287.
Jamesiana, vi. 289.
Jamesii, vi. 289.
Kingii, vi. 283.
labradorica, vi. 298.
laeta, vi. 284.
lanuginosa, vi. 293.
littoralis, vi. 287.
longifolia, vi. 283, 284.
longipes, vi. 283, 285.
var. δ, vi. 284.
" Edwardsii, vi. 284.
" laeta, vi. 284.
" pedunicularis, vi. 284.
macropetala, vi. 288, 301.
marginata, vi. 287.
media, vi. 282.
moenchioides, vi. 282.
nitens, vi. 282.
nitida, vi. 284.
Nuttallii, vi. 289.
obtusa, vi. 287.
ovalifolia, vi. 291.
ovata, vi. 282.
palustris, vi. 284.
prostrata, vi. 282.
pubera, vi. 282, 288.

Stellaria (*continued*).
ruscifolia, vi. 287.
var. arctica, vi. 287.
stricta, vi. 282, 284.
var. γ, vi. 284.
uliginosa, vi. 283. 285.
umbellata, vi. 283.
uniflora, vi. 288.
Stemmadenia bignoniaeflora, xviii. 310.
macrophylla, xviii. 310.
mollis, xviii. 310.
Palmeri, xviii. 311.
tomentosa, xviii. 310.
Stenandrium barbatum, xxv. 89.
Stenocarpha, xvi. 535, 538.
Stenotaphrum, xxiv. 126.
americanum, ix. 149; xxiv. 126.
glabrum, xxiv. 126, 226
Sterculiaceae, xxiv. 176, 243.
Stevia **arachnoidea**, xviii. 326.
Aschenborniana, xviii. 326.
bicrenata, xviii. 326.
clinopodioides, xi. 307.
collodes, xxv. 93.
compacta, xviii. 326.
decumbens, xviii. 326.
diffusa, xi. 307; xviii. 326.
elatior, xviii. 326.
var. **decumbens**, ix. 152; xviii. 326.
laxa, iii. 107.
Liebmannii, xviii. 326.
madrensis, xviii. 326.
micrantha, xi. 307.
monardaefolia, var. **amblyolepis**, xviii. 326.
var. **macrophylla**, xviii. 326.
neurophylla, xviii. 327.
Plummerae, xviii. 326, 327.
Pringlei, xviii. 327.
rapunculoides, xx. 478.
rhombifolia, xviii. 326.
Rosei, xviii. 327.
Seleriana, xviii. 327.
serrata, var. **arguta**, xviii. 328.
" **ovalis**, vi. 317.
tephra, xviii. 328.
trachelioides, xi. 307.
venosa, xviii. 327.
Sticta, xxiv. 88.
aurata, xxiv. 86.
damaecornis, var. Weigelii, xxiv. 88.
quercizans, xxiv. 88.
Weigelii, xxiv. 88.
Stipa, xxiv. 126.
rostrata, xxiv. 126, 226.
Stipulicida, v. 126, 155.
setacea, v. 155.
Strephodon, vi. 276, 280.
Streptotrachelus, xi. 298.
Pringlei, xi. 398.
Stylosanthes, xxiv. 154.
dissitiflora, iii. 105.
humilis, xxiv. 79.
scabra, ix. 146; xxiv. 154, 229.
Styrax **Ramirezii**, xvi. 568; xviii. 309.
Surirella degenerans, xxiv. 90.
formosa, xxiv. 90.
Sweet-William, v. 127.
Symplocos **Pringlei**, i. 168.
prionophylla, i. 169.
Taenitis, xxiv. 115.
angustifolia, xxiv. 115, 225.
Tagetes, xii. 57, 85; xxiv. 220.
erecta, xxiv. 220, 236.
foetidissima, xi. 310.
linifolia, iv. 120.
Nelsonii, xxv. 117.
pedunculata, iv. 121.
tenuifolia, iv. 121.
triradiata, xi. 310.
Tagetineae, xxv. 117.
Tamonea, xxiv. 183.
Tecoma, xxiv. 202.
sp., xxiv. 202, 234.
Telanthera, xxiv. 137, 247.
angustata, ix. 148; xxiv. 140.
argentea, xxiv. 137.
echinocephala, ix. 148, 149; xxiv. 137, 228.
filifolia, xxiv. 138, 228.
flavicoma, ix. 148; xxiv. 138, 139, 228.
frutescens, xxiv. 138, 140, 228.
glaucescens, xxiv. 138, 228.
Helleri, xxiv. 138, 228, 247.
var. **obtusior**, xxiv. 139, 228, 251.
mollis, xviii. 324.
nudicaulis, ix. 148; xxiv. 139, 228.
pubiflora, xviii. 324.
pycnantha, xviii. 324.
rugulosa, xxiv. 139, 228.
Snodgrassii, xxiv. 140, 228.
sp., xxiv. 137, 140.
strictiuscula, xxiv. 140, 228.
vestita, ix. 148; xxiv. 140, 228.
Teloschistes, xxiv. 88.
chrysophthalmus, var. flavicans, xxiv. 88.
flavicans, xxiv. 88.
Tephrocalea, x. 30.
Tephrosia, xxiv. 155.
cinerea, xxiv. 155, 229, 237.
litoralis, ix. 146; xxiv. 155.

Tephrosia (*continued*).
littoralis, xxiv. 155.
macrantha, vii. 383.
Tetrachyron, x. 29.
manicatum, x. 29.
orizabensis, x. 30.
Tetramerium, xxiv. 204.
hispidum, xxiv. 204, 234.
Tetraplandra, xxi. 494.
Teucrium, xxiv. 198.
inflatum, ix. 147; xxiv. 198, 233.
Thalictrum **tomentellum**, iii. 103.
Thallophytes, xxiv. 79.
Theloschistes chrysopthalmus, var. flavicans, ix. 149.
Thelypodium anisopetalum, xiv. 478.
longifolium, iv. 117; xiv. 478.
micranthum, xiv. 478.
Thinogeton, xxiv. 201.
Hookeri, xxiv. 201, 234, 237.
Miersii, xxiv. 201, 234, 237, 247.
Thuya, xxii. 482.
Thyme-leaved sandwort, vi. 292.
Tigridia **pulchella**, ii. 184.
Tiliaceae, xxiv. 172.
Tillandsia, xxiv. 130, 238.
insularis, xxiv. 130, 227, 261.
sp., ix. 148; xxiv. 130.
Tissa, vi. 309.
Clevelandi, vi. 310.
diandra, vi. 310, 311.
gracilis, vi. 311.
leucantha, vi. 313.
macrotheca, var. scariosa, vi. 313.
marina, vi. 312.
pallida, vi. 313.
rubra, vi. 310.
salina, vi. 312.
tenuis, vi. 311.
valida, vi. 313.
villosa, vi. 310.
Tithonia, xvii. 89, 103; xxv. 106.
brachypappa, ii. 174.
calva, xvii. 103.
diversifolia, ii. 175.
platylepis, xvii. 102.
scaberrima, xvii. 102.
tagetiflora, ii. 175.
Tournefortia, xxiv. 193.
difformis, xxiv. 193.
hirsutissima, xxiv. 193, 233.
laurifolia, xxiv. 193, 233.
opaca, ix. 147; xxiv. 193.
psilostachya, ix. 147; xxiv. 193, 233.
psilostachys, xxiv. 193.
pubescens, ix. 147; xxiv. 193, 233.
rufo-sericea, ix. 147; xxiv. 193, 233.
Tournefortia (*continued*).
strigosa, ix. 147; xxiv. 194, 293.
syringaefolia, xxiv. 193.
Tovaria, xix. 557, 562.
Trachyandra echeandioides, xiv. 472.
Tradescantia **angustifolia**, ii. 185; xxv. 70.
brachyphylla, xiv. 471.
commelinoides, xi. 295.
disgrega, xxv. 70.
dracaenoides, xxv. 70.
holosericea, xiv. 471, 472.
var. dracaenoides, xxv. 70.
Karwinskyana, xxv. 71.
linearis, xxv. 71.
longifolia, xiv. 471; xxv. 70.
macrophylla, xiv. 472.
macropoda, xi. 295.
multiflora, xxv. 70.
saxicola, xxv. 70.
Urbinana, xxv. 70.
Tragia **affinis**, vii. 393.
macrocarpa, vii. 393.
Trianthema, xxiv. 144.
monogyna, ix. 146; xxiv. 144.
Portulacastrum, xxiv. 144, 228.
Tribulus, xxiv. 157, 237, 238, 247.
adscendens, xxiv. 156.
brachystylis, xxiv. 157.
cistoides, xxiv. 157, 229, 238.
var. **anacanthus**, xxiv. 157, 230.
maximus, xxiv. 156, 157.
var. adscendens, xxiv. 156.
sericeus, ix. 145; xxiv. 157, 230, 261.
var. erectus, xxiv. 157.
" humifusus, xxiv. 157.
servicens, var. humifusus, xxiv. 157.
sp., xxiv. 157, 230.
terestris, xxiv. 157, 261.
var., xxiv. 79.
Triceratium Anderssonii, xxiv. 90.
gallapagense, xxiv. 90.
laeve, xxiv. 90.
Margaritiferum, xxiv. 90.
Tripos, xxiv. 90.
Trichocoronis, ix. 152.
Trichomanes, xxiv. 241.
Prieurii, xxiv. 262.
pyxidiferum, xxiv. 262.
radicans, xxiv. 262.
Trichoneuron Hookeri, xxiv. 121.
Tricophorum, xv. 498.
cyperinum, xv. 500, 501.
Tridax, x. 3, 22; xvii. 105, 107.
angustifolia, x. 4, 7; xvii. 107.
balbisioides, x. 5, 6.
var. tenuifolia, x. 6.

Tridax (*continued*).
bicolor, x. 8.
brachylepis, x. 4; xvii. 106.
candidissima, x. 10.
coronopifolia, x. 5, 9.
var. **alboradiata**, x. 9.
dubia, x. 3, 10; xvii. 107.
Ehrenbergii, x. 10; xvii. 107.
erecta, x. 8.
Galeottii, x. 8; xvii. 106, 107.
imbricata, x. 9; xvii. 107.
lanceolata, x. 9.
leptophylla, x. 5.
Mandonii, x. 6.
obovata, x. 8.
Palmeri, x. 6.
var. **indivisa**, iii. 109; x. 6.
petrophila, x. 5; xvii. 107.
Pringlei, x. 4.
procumbens, x. 7.
var. **ovatifolia**, x. 7.
rosea, x. 6.
tenuifolia, x. 8.
var. microcephala, x. 8.
trifida, x. 9.
var. alboradiata, x. 9.
trilobata, x. 4.
tuberosa, x. 4; xvii. 106, 107.
verticillata, xvii. 107.
Trigonopterum Ponteni, xxiv. 214.
Trigonospermum floribundum, xxv. 99.
tomentosum, x. 44.
Triodia avenacea, iv. 123.
Trisetum elongatum, iv. 123.
interruptum, iv. 123.
Triumfetta, xxiv. 172.
semitriloba, xxiv. 172, 231.
Trixis, xviii. 331.
Tubiflorae, xix. 544.
Tunica, v. 125, 128.
prolifer, v. 128.
saxifraga, v. 128.
Turnera, xxiv. 177.
ulmifolia, xxiv. 177, 232.
Turneraceae, xxiv. 177.

Uhdea, xvi. 518.
bipinnatifida, xvi. 520.
Ulva, xxiv. 90.
fasciata, xxiv. 90.
Umbelliferae, ii. 168; xxiv. 184, 243.
Unona, ix. 175.
bibracteata, ix. 175.
panamensis, ix. 175.
violacea, ix. 175.
Unxia camphorata, xx. 463.
digyna, xx. 463.
Uralepis avenacea, iv. 123.
Urbinella, xxv. 117, Suppl. leaflet.
Palmeri, xxv. 117.
Urbinia, xxv. Suppl. leaflet.
Urostephanus, ix 159.
gonoloboides, ix. 159.
Urtica canadensis, xxiv. 132.
divaricata, xxiv. 132.
latifolia, xxiv. 132.
racemosa, xxiv. 132.
tuberculata, xxiv. 132.
Urticaceae, xxiv. 132, 243.
Usnea, xxiv. 88.
arthroclada, xxiv. 88.
barbata, ix. 149.
f. ceratina, xxiv. 88.
ceratina, xxiv. 88.
longissima, xxiv. 88.
plicata, xxiv. 88.
Ustilago antherarum, v. 143, 144.

Vaccaria, v. 129.
Valantia hypocarpa, xiv. 468.
hypocarpia, xiv. 468.
Valeriana albonervata, ii. 170.
mexicana, xxi. 503.
Palmeri, vi. 317.
retrorsa, xxi. 502.
sorbifolia, iii. 107.
Vallesia, xxiv. 185.
cymbaefolia, xxiv. 185, 232.
glabra, xxiv. 185.
pubescens, xxiv. 185. 232.
Vargasia caracasana, vi. 326, 327.
Varronia canescens, xxiv. 189.
dasycephala, xxiv. 191.
flava, xxiv. 190.
leucophlyctis, xxiv. 189.
linearis, xxiv. 190.
revoluta, xxiv. 191.
var. nigricans, xxiv. 191.
rotundifolia, xxiv. 190.
scaberrima, xxiv. 190.
Sconleri, xxiv. 191.
Veratrum californicum, xxv. 71.
tenuifolium, ix. 168.
Verbena, vii. 391; xvi. 536; xxiv. 196.
carolina, xxiv. 196, 233.
caroliniana, xxiv. 197.
dichotoma, xxiv. 196.
grisea, ix. 142, 147; xxiv. 197, 233, 247.
litoralis, xxiv. 197, 233, 237.
minima, etc., xix. 491.
officinalis, xxiv. 197, 233.
polystachya, xxiv. 196.
remota, ix. 143.
Verbenaceae, xxiv. 194, 241, 243.

Verbesina, i. 166; xvi. 534–537, 554; xxv. 107.
abscondita, xvi. 557.
acapulcensis, xvi. 551.
acuminata, xvi. 561.
aestuans, xvi. 564.
alata, xvi. 537.
alternifolia, xvi. 565.
ancistrophora, xvi. 537, 565.
arborea, xvi. 563.
argentea, xvi. 564.
Arnottii, xvi. 546, 565.
aspilioides, xvi. 546.
atriplicifolia. xvi. 515.
aurea, xvi. 566.
auriculata, ii. 175; xvi. 547, 563.
aurita, xvi. 544.
australis, xvi. 535, 544.
bipinnatifida, xvi. 563.
boliviana, xvi. 549, 565.
Bridgesii, xvi. 549, 565.
capitaneja, xvi. 540; xxv. 113.
caracasana, xvi. 559.
chiapensis, xvi. 554.
chihuahuensis, xvi. 542, 543.
cinerascens, xvi. 555.
cinerea, xvi. 554.
Clausseni, xvi. 564.
coahuilensis, xvi. 546.
var. **viridior**, xvi. 546.
conyzoides, xvi. 552, 564.
Coulteri, xvi. 540.
crassipes, xvi. 555.
crocata, xvi. 537.
crocea, xvi. 540.
Cumingii, xvi. 563.
cymosa, xvi. 563, 565.
decurrens, xvi. 564.
dentata, xvi. 556.
dichotoma, xxiv. 210.
dissita, xvi. 542.
diversifolia, xvi. 562.
Donnell-Smithii, xvi. 556.
elegans, xvi. 545, 547, 564.
encelioides, xvi. 543, 544.
var. **cana**, xvi. 543, 544.
" **exauriculata**, xvi. 544.
erosa, xvi. 542.
fastigiata, xvi. 558.
floribunda, xvi. 563.
Fraseri, xvi. 537.
var. Nelsoni, xvi. 537.
gigantea, xvi. 561, 562.
glabrata, xvi. 547.
Grayi, xvi. 553.
Grisebachii, xvi. 563.
guatemalensis, xvi. 549, 550.
guianensis, xvi. 563.

Verbesina (*continued*).
hastata, xvi. 543, 565.
helianthoides, xvi. 546, 547, 549, 554, 563–565.
heterophylla, xvi. 538, 540.
Hookerii, xvi. 546, 565.
Humboldtii, i. 166; xvi. 554, 564.
hypargyrea, xvi. 556.
hypoglauca, xvi. 545, 548.
hypoleuca, xvi. 546.
hypomalaca, xvi. 545.
var. **hypochlora**, xvi. 545.
ilicifolia, xvi. 564.
involucrata, xvi. 564.
Klattii, xvi. 538.
lacinata, xvi. 560.
lanata, xvi. 558.
leprosa, xvi. 557, 561.
leptochaeta, xvi. 542.
Liebmannii, xvi. 548.
Lindheimeri, xvi. 539, 541.
linifolia, xvi. 565; xxiv. 215.
littoralis, ix. 147.
longifolia, xvi. 545.
longipes, xvi. 541.
madrensis, xxv. 112.
Mameana, xvi. 564.
Mandonii, xvi. 547.
megapotamica, xvi. 565.
microcephala, xvi. 562.
microptera, xvi. 560.
var. **mollissima**, xvi. 560.
molinaria, xvi. 553.
mollis, xvi. 552.
montanoifolia, xvi. 559.
Moritziana, xvi. 561.
myriocephala, xvi. 561.
nana, xvi. 543.
Nelsonii, x. 46; xvi. 549.
neriifolia, xvi. 548.
nicaraguensis, xvi. 562.
nicotianaefolia, xvi. 563.
nudicaulis, xvi. 542.
oaxacana, xvi. 548, 557, 565.
occidentalis, xvi. 545, 549.
Oerstediana, xvi. 558.
olivacea, xvi. 557, 565, 566.
oncophora, iii. 109; xi. 309; xvi. 552, 553.
oreopola, xvi. 549, 550.
ovata, xvi. 539, 565.
ovatifolia, xvi. 537.
pallens, xvi. 550.
Palmeri, xvi. 542.
paniculata, xvi. 566.
pauciflora, xvi. 563, 565.
persicaefolia, xvi. 556.

Verbesina (*continued*).
persicifolia, iii. 109; xvi. 550, 552, 556, 566.
perymenioides, i. 166; xvi. 557.
pinnata, xvi. 562.
pinnatifida, xvi. 558, 559, 562, 566.
platyptera, xvi. 538.
podocephala, xvi. 566.
polycephala, xvi. 560.
populifolia, xvi. 565.
potosina, ii. 175; xvi. 549.
Pringlei, ii. 175; xvi. 553.
prostrata, xvi. 565.
pterocaula, xvi. 539, 565.
punctata, xvi. 561.
resinosa, xvi. 553.
Robinsonii, xvi. 554.
Rosei, xvi. 539.
Rothrockii, xvi. 541.
rumicifolia, xvi. 560.
salicifolia, xvi. 550, 552, 555, 561.
Sartorii, xvi. 557, 566.
Saubinetia, xvi. 551.
scabra, xvi. 538, 539.
scandens, xvi. 565, 566.
scaposa, xvi. 565.
Schaffneri, xvi. 540.
var. exalata, xvi. 539, 540.
Schomburgkii, xvi. 564.
Seemannii, x. 48; xvi. 557.
semiserrata, xvi. 554.
sericea, xvi. 552.
serrata, ii. 176; xvi. 552.
var. amphichlora, xvi. 553.
" Pringlei, xvi. 553.
sinuata, xvi. 560.
Smithii, x. 46; xvi. 557.
Soratae, xvi. 551.
sordescens, xvi. 554.
var. semiserrata, xvi. 554.
sororia, xvi. 545, 548.
sphaerocephala, xvi. 538.
stenophylla, xi. 309; xvi. 546.
stricta, xvi. 545.
subcordata, xvi. 546, 547.
sublobata, xvi. 562, 566.
tetraptera, xvi. 538, 539.
tomentosa, xvi. 562, 566.
tridentata, xvi. 566.
trilobata, x. 46; xvi. 559.
triplinervia, xvi. 565.
triradiata, xvi. 565.
tuberosa, xvi. 566.
turbacensis, xvi. 562.
variabilis, x. 47; xvi. 548.
venosa, xvi. 543, 565.
verbascifolia, xvi. 561, 562.
viguieroides, xvi. 547.
Verbesina (*continued*).
virgata, xvi. 550, 552, 556, 566.
var. conyzoides, xvi. 552.
virginica, xvi. 550.
α, xvi. 560.
var. γ insularis, xvi. 560.
" β laciniata, xvi. 560.
" Palmeri, xvi. 561.
Warei, xvi. 542.
Wrightii, xvi. 537, 541, 565.
xanthochlora, xvi. 551.
Verbesinaria, xvi. 534, 535, 545.
Verbesineae, xvi. 507, 508; xxv. 106, Suppl. leaflet.
Vernonia, xviii. 313.
Andrieuxii, xi. 293.
andromachioides, xi. 293.
liatroides, xviii. 325.
serratuloides, iii. 112; xviii. 313.
vernicosa, var. comosa, xxv. 93.
Vernoniaceae, xii. 61.
Verrucaria cerina, xxiv. 86.
Viburnum elatum, xi. 306.
microcarpum, var. evanescens, xviii. 313.
Opulus, xxiii. 184.
Vigna, xxiv. 155, 238.
luteola, var. angustifolia, ii. 167.
oahuensis, xxiv. 155.
owahuensis, xxiv. 155, 229.
owaihensis, xxiv. 155.
owyhensis, var., xxiv. 155.
strobilophora, ii. 167; vii. 386.
Vignea Gebhardi, xxii. 489.
stellulata, xxii. 483.
Vigneae, xxii. 447.
Viguiera, x. 45; xvi. 529; xvii. 88; xxv. 104, 106, 107.
blepharolepis, xvii. 88.
brevifolia, xxv. 103.
buddleiaeformis, xvii. 88.
cordifolia, var. latisquama, xxv. 103.
decurrens, xxv. 106.
eriophora, xxv. 104.
excelsa, xvii. 88, 102; xxv. 106.
Ghiesbreghtii, xvii. 88, 101.
Goldmanii, xxv. 104.
helianthoides, xxv. 105.
hypargyrea, xxv. 105.
microcephala, xxv. 105.
microphylla, xxv. 103.
montana, xxv. 104.
Nelsonii, x. 45.
pedunculata, iv. 119.
Pringlei, vii. 387.
Rosei, xxv. 105.
tenuis, xxv. 105.
Villanova achillaeoides, xx. 465.

Vincetoxicum, ix. 147; xi. 299; xxiv. 185, 186.
sp., xxiv. 232.
Viola **reptans**, ii. 165.
Selkirkii, xxiii. 184.
Viscaria, v. 152.
Viscum florianum, xxiv. 133.
galapageium, xxiv. 133.
galapagejum, xxiv. 133.
Henslovii, ix. 148; xxiv. 133.
Vitaceae, xxiv. 172.
Vitex mollis, vi. 321.
pyramidata, vi. 321.
Vitis, xxiv. 172.
sicyoides, xxiv. 172.
vinifera, xxiv. 172, 231, 238.
Vittaria costata, xxiv. 115.
Vulgares, xix. 508, 510; xxi. 500.

Wahlbergella affinis, v. 150.
apetala, v. 151.
triflora, v. 149.
Waltheria, xxiv. 176.
ovata, xxiv. 79.
reticulata, ix. 145, 149; xxiv. 176, 232.
forma **acamata**, xxiv. 176, 232.
" **Anderssonii**, xxiv. 176, 177, 232.
" **intermedia**, xxiv. 177, 232.
Wedelia, xxv. 102.
aurea, xvi. 566.
cordata, xvii. 94.
frutescens, xxiv. 211.
minor, xx. 463.
ovatifolia, xx. 463.
paludosa, xxiv. 263.
subflexuosa, xvii. 96.
tenuicaulis, xxiv. 211.
White Birch, xxiii. 171, 172.
Campion, v. 151.
Whitneya, xxv. 175.
Wild Pink, v. 134.
Willugbaeya, x. 11.
globosa, x. 11.
Withania **melanocystis**, i. 171.
Witheringia macrophylla, i. 171.
Wool-grass, xv. 498–500.

Xanthocephalum Alamani, xxi. 505.
megalocephalum, xxi. 505.
tomentellum, ii. 172.
Xanthoxylon, xxiv. 158.
Pterota, ix. 145, 149.
Ximenesia, xvi. 534–537, 543.
australis, xvi. 544.
Ximenesia (*continued*).
encelioides, xvi. 543, 544.
var. δ, cana, xvi. 544.
" hortensis, xvi. 544.
" nana, xvi. 543.
microptera, xvi. 544.
Xylosma **Pringlei**, i. 164; ii. 166.

Yucca, xiv. 474.

Zaluzania, x. 28; xvi. 507, 530; xvii. 89, 104.
anthemidifolia, xvi. 531.
asperrima, xvi. 532, 533.
var. **montagnaefolia**, xvi. 532.
augusta, xvi. 532.
cinerascens, xvii. 90.
Coulteri, xvi. 533.
discoidea, xvi. 534; xxv. 102.
ensifolia, xvii. 100.
globosa, xvi. 530, 531.
Grayana, xvi. 531.
Grayiana, xvii. 104.
megacephala, xvi. 532, 533.
mollissima, xvi. 532.
montagnaefolia, xvi. 532.
myriophylla, xvi. 530.
pinnatilobata, xvii. 90.
Pringlei, xxv. 101.
resinosa, xvi. 533.
squarrosa, xvii. 100.
triloba, xvi. 531, 532; xvii. 104.
trilobata, xvi. 531.
Zanthoxylum, xxiv. 158, 237.
lentiscifolium, xxiv. 158.
Pterota, xxiv. 158, 230.
Zarabellia, xx. 455, 460.
Zephyranthes **Conzattii**, xiv. 473.
lilacina, xiv. 473.
Lindleyana, xiv. 473.
Nelsonii, xiv. 473.
texana, xiv. 473.
Zexmenia aurea, xvi. 566.
fasciculata, xvi. 529.
Grayii, xvi. 553.
podocephala, xvi. 566.
Pringlei, xiv. 489.
Zinnia, x. 14.
acerosa, x. 14, 15.
ambigua, x. 20.
angustifolia, x. 18.
anomala, x. 15.
bicolor, x. 16.
discolor, x. 20.
elegans, x. 18.
floridana, x. 19.
grandiflora, x. 15, 20.
Ghiesbreghtii, x. 18.

Zinnia (*continued*).
Greggii, x. 16.
Haageana, x. 18.
hybrida, x. 20.
intermedia, x. 19.
juniperifolia, x. 15.
leptopoda, x. 19.
Liebmannii. x. 19.
linearis, x. 17.
var. latifolia, x. 18.
littoralis, x, 16.
lutea, x. 19.
maritima, x. 16, 17.
Mendocino, x. 19.
mexicana, x. 18.
Zinnia (*continued*).
multiflora, x. 19, 20.
Palmeri, x. 17.
pauciflora, x. 19.
pumila, x. 15.
Roezlii, x. 20.
tenuiflora, x. 19.
verticillata, x. 20.
Zonaria, xxiv. 93.
lobata, ix. 149; xxiv. 91, 93, 98.
rubra, xxiv. 99.
Zygadenus elegans, xxv. 71.
mohinorensis, xxv. 71.
Zygophyllaceae, xxiv. 156, 243.
Zygophyllidium, xxi. 495.

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Prof. Trelease,

Dear Sir:

Your letter inclosing payment for Contribution no. 1 has been received. The former Contributions from this Herbarium have not been numbered consecutively - with the exception of Dr. Watson's "Contributions to American Botany" nos. 1 to 18. These were mostly published in Proc. Am. Acad. 1873-1891. nos. 1 & 3, were published in the Am. Nat. 1873, vol. 7. Dr. Gray, Horace Mann, and several others, who have been connected with this institution, have issued various papers and in commencing a numbered series it was given the

designation "new series" that these former papers should not seem to be ignored.

Very respectfully,

Mary A. Day.

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no. I. B. L. Robinson. Descriptions of new plants, chiefly Gamopetalae, collected in Mexico by C. G. Pringle in 1889 and 1890.

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no. IV. H. E. Sealon. New and little known plants collected on Mt. Orizaba in the summer of 1891.

no. V. B. L. Robinson. North American Sileneae and Polycarpeae.

no. VI. B. L. Robinson. North American Alsineae. [and other short papers].

no. VII. B. L. Robinson and J. M. Greenman. Further new and imperfectly known plants collected in Mexico by C. G. Pringle in the summer of 1893.

Cont. 1, 2, 3.
7/3178

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no. VIII. B. L. Robinson and M. L. Fernald. New plants collected by Messrs. C. V. Hartman and C. C. Lloyd xxx in northwestern Mexico.

no. IX. B. L. Robinson and J. M. Greenman - I. On the flora of the Galapagos Islands.

II. New and noteworthy plants from Oaxaca - III. Synoptic revision of the genus Lamourouxia - IV. Miscellaneous new species.

no. X. B. L. Robinson and J. M. Greenman - I. Revision Triaxx. II. Synopsis Mikania. III. Revision Zinnia IV. Revision Calea - V. Provisional key to Porophyllum. VI. Descriptions of new and little known Phanerogams.

no. XI. J. M. Greenman - I. Revision Houstonia II. Key to Liabum. III. Descriptions of new and little known plants.

no. XII. M. L. Fernald - I. Systematic study of Pectis. II. Some rare and undescribed plants.

no. XIII. B. L. Robinson - I. Revision Mimosa - II. Revision Neptunia.

no. XIV. J. M. Greenman - I. Revision Galium and Relbunium. II, New Mexican Phanerogams.

DESCRIPTIONS OF NEW PLANTS, CHIEFLY *GAMOPETALÆ*, COLLECTED IN MEXICO BY C. G. PRINGLE IN 1889 AND 1890.

BY

B. L. ROBINSON.

From the Proceedings of the American Academy of Arts and Sciences,
Vol. XXVI.

Issued July 31, 1891.

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VOL. XXVI.

ISSUED JULY 31, 1891.

XII.

CONTRIBUTION FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

DESCRIPTIONS OF NEW PLANTS, CHIEFLY *GAMOPETALÆ*, COLLECTED IN MEXICO BY C. G. PRINGLE IN 1889 AND 1890.*

By B. L. Robinson.

Presented by Sereno Watson, April 8, 1891.

Xylosma Pringlei. Monœcious, glabrous, armed at the nodes with simple acicular spines 3 to 5 lines in length: leaves small, fascicled in the axils of the spines, coriaceous, elliptical, obtuse, attenuate to a subsessile base, serrulate, veiny, shining above, pale beneath, 9 to 16 lines long by half as broad; the edges more or less revolute and the teeth incurved: flowers fasciculately grouped, 3 to 6 together, with no common peduncle; pedicels slender, 3 or 4 lines long: sepals 4, ovate, acutish, scarcely exceeding half a line in length, glabrous or puberulent on the outer surface, ciliate, minutely pubescent within: stamens 12 to 18, twice as long as the sepals: style 2–3-cleft, and the ovate ovary incompletely 2–3-celled; fruit not seen. — In the Sierra Madre near Monterey, August, 1889 (n. 2784). This is perhaps the same as Dr. Palmer's n. 1062 (collected between San Luis Potosi and Tampico), which differs principally in its ovate leaves and verrucose stem.

Desmodium Jaliscanum, Watson, var. (?) obtusum. Stem 5 to 10 feet high: leaves elliptic, oblong, or even slightly obovate, very obtuse, apiculate: calyx-teeth ovate, obtusish, the upper one retuse; pods appressed-pubescent, very numerous in dense simple or branched racemes. — Rocky slopes, Tamasopo Cañon, San Luis Potosi; October, 1890 (n. 3290).

Pimpinella Mexicana. Glabrous: root more or less thickened; stem 4 feet high, with scanty foliage, paniculately branched above: the radical and lower cauline leaves very long-petioled, ternate; leaf-

* Of the plants here described the last three only were sent from California and Washington by other collectors.

lets deeply 2–3-parted, the segments ovate or lanceolate, acuminate, more or less narrowed at base, 1 to 1½ inches long, 10 lines or less in breadth, green above, pale beneath, serrate, the margins of the teeth being slightly thickened and cartilaginous; upper leaves scattered in the diffusely branched inflorescence, pinnately or ternately parted with long linear toothed or serrate segments; the highest leaves reduced to filiform bracts; involucres and involucels none: umbels numerous, with few (2 to 6) often unequal rays 6 to 9 lines in length; umbellets about 12-flowered, only 2 or 3 flowers in each being fertile: corolla white (?) or in the sterile flowers not infrequently purple: fruit a line long, the ribs not very prominent; stylopodium depressed, the margin crenate; oil-tubes numerous; inner surface of the seed plane or very shallowly concave. — Hills of Patzcuaro, Michoacan; November, 1890 (n. 3331).

EUPATORIUM ESPINOSARUM, Gray, var. SUBINTEGRIFOLIUM. Leaves ovate, acuminate, subentire, very glutinous on both sides: scales of the involucre a little longer and more acute than in the typical form, being in these respects more as in var. *ambiguum*, Gray. — Shaded ledges of lime-rock, San José Pass, San Luis Potosi; October, 1890 (n. 3311).

GYMNOLOMIA DECUMBENS. Stems several from a ligneous base, decumbent, simple or branched from near the root, smoothish below, roughened above with very short appressed hairs: lower leaves opposite, elliptical, acute, narrowed to a sessile base, subentire, thickish, rough-pubescent, green on both sides, 1½ inches long by half as broad; the upper similar but narrower, alternate, sparse: heads terminal, solitary or 2 or 3 together; involucre ½ inch in diameter; outer scales ovate, acuminate, very rough, the inner larger, smoother, obtusish; chaff oblanceolate, acuminate; rays 12 to 15, narrow, over half an inch in length, yellow; achenes (immature) smooth, angled, and with no trace of teeth or awns. — Rocky hills, Tultenango, State of Mexico; September, 1890 (n. 3263). This species resembles *G. rudis*, Gray, but differs in its decumbent habit, smaller and more entire leaves, smaller heads, ovate not oblong involucral scales, and longer narrower rays. From *G. multiflora*, Nutt., it differs in the ligneous clearly perennial base, as well as in the involucre, etc.

OTOPAPPUS ALTERNIFOLIUS. Stem 3 to 6 feet high, striate, smoothish or slightly tomentulose: leaves alternate, ovate-lanceolate, acuminate at both ends, subsessile, with a short roughish pubescence above, white-tomentose beneath: heads in an open corymb, about 15, half an inch or more in diameter; scales of the involucre in several rows, nar-

rowly oblong or lanceolate, some rounded at the apex, others acute: rays 12 to 25, little exceeding the disk; pappus of two very unequal awns, the inner more than half as long as the achene, the outer much shorter; achenes smooth, with a single rib on each face, edges acute, the outer usually wingless, the inner with a narrow wing, which extends up upon the inner awn and there broadens into an auricular appendage. — Limestone hills, San José Pass, San Luis Potosi; October, 1890 (n. 3310). From its peculiar pappus with wing-appendages this plant must be referred to the genus *Otopappus* as extended by Hemsley (Biol. Cent. Am. Bot. 2. 191), and placed near *O. epaleaceus*, Hemsl. The whole habit of the plant with its alternate leaves is that of a *Verbesina*, and it seems thus to connect the two genera, especially since there are several species of *Verbesina*, as *V. Humboldtii*, Spreng., and *V. perymenoides*, Schultz Bip., in which the achenes are more strongly winged on one side than on the other.

Senecio Guadalajarensis. Herbaceous; stem erect, leafy, sulcate-striate, smooth: leaves elongated lanceolate, 6 to 8 inches long, 9 to 15 lines broad, acute, narrowed at base to a very short naked petiole, pinnately veined, callous-denticulate and minutely ciliate, coriaceous, glabrous on both sides except the veins beneath, the upper surface green, covered with lighter-colored warty blotches (pathological?), the lower surface very glaucous: corymb ample, with rather numerous medium-sized heads; scales of the involucre about 10, strongly carinate, acutish, 4 lines long: rays about 5, rounded at the apex; teeth of the disk-corollas exceeding the short campanulate throat and half the length of the slender tube proper: achenes ribbed, puberulent. — Rich slopes of barranca near Guadalajara, Jalisco; September, 1890 (n. 3280).

Laurentia ovatifolia. Annual, 6 to 12 inches high, puberulent; stem slender, flexuous, angled, subsimple or branched above: leaves petiolate, ovate, acute, abrupt or subcordate at base, finely and regularly serrate, about an inch long, two thirds as broad, the lowest smaller, rounder, obtuse, the upper lanceolate; petioles 3 to 5 lines long; pedicels filiform, curving upward, 9 to 12 lines long, two to four times longer than the linear-filiform bracts: flowers small, racemose; calyx-tube hardly any, the lobes linear, acute, not quite equalling the corolla-tube; corolla 2 lines long, the nearly white tube split half-way to the base behind; limb blue, with very dissimilar lobes, the three lower obovate, somewhat united to form a spreading lip, the two upper erect, contracted to narrow points: stamens inserted near the middle of the tube, the two smaller anthers penicillate: capsule

ovate-oblong or elliptic in outline, papery, almost entirely superior, 2-valved at the apex. — Shaded banks near Guadalajara; September, 1889 (n. 2985); also near Cardenas, San Luis Potosi, 1890 (n. 3302). This plant, which was distributed under the name of *Laurentia Michoacana*, var. *ovatifolia*, appears on further examination to be distinct from n. 3337, of which it was at first regarded as a variety. It has the habit of a *Lobelia*, but the corolla is split behind only part way to the base. While in the limb of the corolla and the insertion of the stamens it agrees rather closely with *Palmerella*, the corolla-tube is short, as in *Laurentia*. The plant thus furnishes additional evidence that Schönland is right in uniting the two genera.

Mr. Pringle's n. 3337, the plant which was distributed as *Laurentia Michoacana*, Robinson, is without doubt closely related to the species just described, but is distinguished by its sessile leaves of considerably different form and toothing. It appears to be identical with Parry & Palmer's n. 557, which Hemsley refers to *Lobelia micrantha*, HBK., and with Mr. J. Donnell Smith's n. 22, the *Lobelia Türckheimii* of Vatke (unedited?). The corolla in all these plants, however, is cleft only from one third to half-way to the base, a character which should certainly exclude them from *Lobelia*, as at present defined by Bentham & Hooker, Baillon, Schönland, and others. While the specimens in question agree in most points with *Laurentia ramosissima*, Benth. & Hook. (*Lobelia ramosissima*, Mart. & Gal.), they are distinguished by their much smaller flowers. Unfortunately, however, Martens and Galeotti have characterized, under the name of *Lobelia parviflora*, a plant which also appears from their rather unsatisfactory description to differ from their *Lobelia ramosissima* chiefly in the same respect, namely the shorter corolla. This being the case, it seems best that all three of the numbers just cited should be for the present doubtfully referred to *Lobelia parviflora*, Mart. & Gal., since it is highly probable that the type of this species will be found on investigation to be a *Laurentia*, just as the *Lobelia ramosissima* of the same authors has already proved.

LOBELIA NOVELLA. Stem a foot high, branching, with a few rather large leaves near the base, almost naked above: leaves petiolate, broadly ovate, acute or obtusish, rounded or subcordate at base, undulate and finely mucronate-denticulate, hispid on both sides, scarcely paler beneath, $2\frac{1}{2}$ to 3 inches long, 2 inches in breadth; upper leaves few, much smaller, sharply and doubly denticulate; racemes long, secund; bractlets minute, scarcely exceeding a line in length; pedicels 6 to 9 lines long: calyx-tube turbinate, in fruit equalling or surpassing the

narrowly linear obtuse lobes; corolla blue and white, the lobes of the lower lip obovate-spatulate, longer than the very narrow upper lobes; capsule half-inferior. — Cool ledges and gravelly banks, Tamasopo Cañon, San Luis Potosi; October, 1890 (n. 3288). Resembles *L. Sartorii*, Vatke (ex char.), but is distinguished by the elongated racemes, and by the size, shape, and indentation of the leaves.

NEMACLADUS OPPOSITIFOLIUS. Stems a foot high, much branched from near the ground; branches becoming erect from a decumbent base, usually simple, each bearing about six pairs of subopposite leaves, and then continued as a long naked racemose inflorescence: leaves petiolate, ovate, acuminate, rounded at base but inconspicuously decurrent upon the petioles and stem, sharply dentate, smooth, 9 to 15 lines long; petioles 2 or 3 lines in length; bracts minute, awl-shaped, scarcely a line in length, the bractlets subtending the calyx similar; pedicels not exceeding 2 lines long: calyx-tube short, rounded at base, the segments equal, awl-shaped, acute, a line long; corolla-tube not equalling the calyx-lobes, the lower lip consisting of two ovate spreading segments, much longer than the three upper lobes: stamineal column ascending against the upper lip of the corolla and then curved forward; anthers stellately divaricate around the stigma, not at all appendaged: mature capsule nearly equalling the calyx-lobes, two-valved at the apex. — Dry calcareous bluffs near Cardenas, San Luis Potosi; October, 1890 (n. 3300). This plant, which is identical with Dr. Coulter's n. 30, differs greatly in habit from the known species of *Nemacladus*. It possesses, however, just the characters which distinguish this genus in such a marked manner; namely, the stellately divaricate anthers, and the division of the corolla into a three-lobed upper lip and a two-lobed lower lip. The subopposite leaves appear to be anomalous among the *Lobeliaceæ*.

SYMPLOCOS PRINGLEI. A small tree, 20 to 30 feet high; branchlets and petioles covered with a very short rufous tomentum: leaves elliptical, varying from obtusish to abruptly acuminate, cuneate at base, sharply and regularly serrulate, subcoriaceous, green and glabrous above, slightly paler beneath and pubescent especially along the midrib, $2\frac{1}{2}$ to 4 inches long by $1\frac{1}{2}$ broad; petioles 4 to 6 lines long: flowers usually aggregated by twos and threes, subsessile upon a scarcely distinguishable common peduncle, occasionally solitary; calyx silvery-sericeous; lobes ovate, rounded or more or less pointed at the apex; petals 5, broadly spatulate, coherent for a third of their length, either smooth or very minutely pubescent on the outer surface: stamens obscurely 4–5-delphous, united high up, adnate to the corolla for half its

length : lower part of the style as well as the apex of the ovary strongly hirsute ; ovary 3-celled ; fruit oblong, dark-colored, with slight puberulence, tipped with the hardened calyx-teeth. — Hills of Patzcuaro, Michoacan ; November, 1890 (n. 3345). Resembles in many respects *S. prionophylla*, Hemsl. (ex char.), but has leaves not at all ovate, and the petals nearly smooth and united with each other and with the stamens for about half their length. In the species just mentioned they are described as nearly or quite free.

GONOLOBUS PARVIFLORUS, Gray, var. BREVICORONATUS. Corolla erect, instead of being reflexed as in the type ; the outer crown of five short rather thick truncate scales, which are not at all produced into lobes at the edges ; the inner crown of five horns as in the typical form. — Laredo, Texas ; July, 1889 (n. 3029).

BUDDLEIA CHAPALANA. Suffruticose ; branches with a smooth yellowish bark ; branchlets woolly : leaves ovate or ovate-oblong, 1½ to 2½ inches long, an inch broad, appearing more or less rhombic in outline from being contracted at base into a broadly winged petiole, auriculate-perfoliate, acute, rather coarsely and bluntly toothed, woolly on both sides when young, becoming nearly smooth at maturity and retaining only a slight mealiness ; floral leaves much smaller, lanceolate, scarcely perfoliate : flowers in globular heads ; the heads half an inch in diameter and borne in pairs on axillary peduncles about 4 lines long ; corolla 1½ lines in diameter, short, not or scarcely exceeding the woolly calyx. — On dry cliffs in the mountains near Lake Chapala, Jalisco ; December, 1889 (n. 2972).

CORDIA PRINGLEI. A shrub 10 to 15 feet high, belonging to the section *Dasycephalæ ;* branchlets, peduncles and petioles stellate-tomentose : leaves ovate or ovate-oblong, more or less narrowed to an obtuse apex, often one-sided, all but the smallest abrupt or even subcordate at base, crenate-dentate with irregular teeth, green and finely stellate-pubescent above, lighter and tomentose beneath, 3 inches long, 1 or 2 inches broad ; petioles 6 lines in length : heads globular, an inch in diameter on subterminal peduncles 1½ inches long ; calyx narrowly campanulate, the tube white-pubescent, and the filiform teeth stellately ferruginous-pubescent, curled irregularly, mostly reflexed ; corolla funnel-form, white, 5 lines broad, with obtuse lobes : stamens inserted near the summit of the pubescent throat. — Las Palmas, San Luis Potosi ; June, 1890 (n. 3091). Differs from *C. ambigua*, Cham. & Schl., in its larger heads and the abrupt or subcordate bases of the leaves, as well as in the absence of the long spreading hairs on the petioles and peduncles. Mr. Pringle's plant much resembles a speci-

men from Nicaragua, collected by C. Wright (N. Pacif. Expl. Exped. 1853–56). The latter differs, however, in its larger flowers and more finely toothed leaves, which are more densely and roughly pubescent upon the upper surface.

HELIOTROPIUM PRINGLEI. A spreading annual, branching from the base, 2 to 5 inches high, silky-villous: leaves elliptic-lanceolate, acute at both ends, 4 to 6 lines long, 2 lines broad; petioles 1 or 2 lines long: flowers scattered along the leafy branches from near the base; calyx-lobes lance-linear, acuminate; corolla-tube 1 to $1\frac{1}{2}$ lines long, the limb abruptly expanding, $2\frac{1}{2}$ lines broad, with five acutish primary lobes, with which five short teeth alternate: fruit separable at maturity into fonr nutlets, minutely reticulate-roughened on the back but not hispid. — Santa Eulalia Mountains, Chihuahua. October, 1886 (n. 1160); also in thin soil of rocky hills, Las Canoas, San Luis Potosi, July, 1890 (n. 3207). This species resembles in habit *H. phyllostachyum*, Torr., but has flowers more than twice as large. It is distinguished from *H. limbatum*, Benth., under which name n. 1160 was distributed, by its broader leaves, very scattered flowers, more acute lobes of calyx and corolla, rougher nutlets, and its more decidedly annual character. The inflorescence in *H. limbatum* is distinctly terminal and compact, and the root often clearly perennial.

OMPHALODES ACUMINATA. Stem weak, procumbent, diffusely branched, nearly smooth, 18 inches long or more, leafy throughout: leaves deltoid, attenuate-acuminate, entire, 2 inches long, 15 lines in breadth, cordate with rounded lobes and broad sinus, membranaceous, nearly smooth above, puberulent with very short hairs beneath; the upper leaves smaller, lanceolate, subcordate or rounded at base; petioles 1 to $1\frac{1}{2}$ inches long: peduncles lateral, scattered, very slender, flexuous-spreading, 9 to 12 lines in length: calyx-lobes oblong, acute; corolla 4 or 5 lines broad, rose-color, with short tube and rounded spreading segments; scales very prominent, nearly globular, minutely papillose: nutlets orbicular, only one in each flower ripening, $1\frac{1}{2}$ lines in diameter at maturity, flat, horizontal over the gynobase, the wing reflexed, about 30-toothed. — In the Sierra Madre, near Monterey; June, 1888 (n. 2220). Resembles *O. cardiophylla*, Gray, but is smoother throughout and has much longer stems of more straggling habit, the leaves twice as large, of more delicate texture, and much more attenuate at the apex. In that species, moreover, two to four nutlets mature and the wing-borders have but half as many teeth.

IPOMŒA LEONENSIS. Root tuberous, an inch thick; stem twining, striate-angulate, minutely roughened: leaves deeply palmately 5-lobed,

cordate or subcordate, 3 to 5 inches broad, punctate above and with a soft deciduous tomentum beneath, the lobes lanceolate, rounded at the apex and inconspicuously mucronate, or in young leaves sometimes acutish, the two outer lobes of the larger leaves each appendaged at base with a large blunt auricle; petioles an inch long or more, roughened especially near the base by numerous small tuberculate glands: peduncles 2 inches long, 1-flowered, puberulent; bractlets minute or obsolete; pedicels half an inch long: sepals ovate, with rounded apex, 4 lines long, canescent with very short appressed silvery hairs; corolla nearly 3 inches long, twice the length of the stamens, purple. — Calcareous ledges near Monterey; June, 1889 (n. 2840). Allied to *F. digitata*, L., but differing in its 1-flowered peduncles and glandular petioles, as well as in the shape and pubescence of the leaves. The flowers are also larger and the throat relatively narrower.

Bassovia Mexicana. A shrub, 5 to 15 feet high; branches unequally dichotomous, slightly striate-angled and minutely verrucose: leaves membranaceous, geminate, ovate, acuminate, the larger $1\frac{1}{2}$ to 2 inches long, $\frac{3}{4}$ to 1 inch broad, the smaller half as large, all abrupt at base or slightly decurrent on one side upon the slender petiole, green on both sides, slightly scabrous above, sparsely pubescent on the veins beneath: inflorescence umbelliform, sessile, axillary; pedicels 2 to 6, 1-flowered, 4 to 5 lines long, striate, slightly thickened upward: calyx spreading, shallow cup-shaped, strictly truncate, persistent; corolla 3 to $3\frac{1}{2}$ lines in length, divided to the middle or even more deeply; tube short, slender; limb campanulate, of 4 or 5 lanceolate acuminate segments, puberulent upon the outside; stamens exserted, the filaments at maturity exceeding the anthers; throat of the corolla and base of the filaments bearded: fruit the size of a pea, red (turning black?), many-seeded; seeds a little over half a line in diameter, compressed, roughened with pits. — Tamasopo Cañon, San Luis Potosi; June, 1890 (n. 3071). Resembles some species of the genus *Brachistus* in its truncate calyx, but has the deeply cleft valvate corolla of *Bassovia*, and shows close affinity to *B. macrophylla*, Benth. & Hook. (*Witheringia macrophylla*, auct.), from which it differs principally in its ligneous stem, much smaller leaves, fewer-flowered fascicles, and more persistent calyx. The distinctions between *Bassovia* and *Brachistus* are not at all satisfactory, and considering the intermediate character of this new species it seems best to refer it to the older genus.

Withania(?) melanocystis. A shrub, 5 to 8 feet high, minutely pubescent on the leaves and younger parts; branches gray, striate: leaves single or geminate, lanceolate to ovate-lanceolate, acute, entire

15 lines long by 6 wide, narrowed at the base into a petiole 3 to 4 lines in length: flowers 2 to 4 at each node, usually but one of each group fruiting; common peduncle none; pedicels slender, 3 lines long: calyx-teeth 5, at anthesis ovate, one third as long as the tube; fruiting calyx much enlarged, bladder-like, neither angled nor conspicuously veined, becoming black, 9 lines in diameter, with throat contracted and teeth relatively short; corolla campanulate, 5 lines long, with a more or less spreading limb of five ovate acutish segments equalling the tube, pale yellow with conspicuous dark spots in the puberulent throat; filaments inserted in the middle of the short tube, half the length of the oblong anthers: berry globular, red, much smaller than the enclosing calyx; seeds roughened, compressed, yellow. — Tamasopo Cañon, San Luis Potosi; June to October, 1890 (n. 3285). A plant of puzzling affinities, possessing the habit of a *Physalis*, but having a woody stem, clustered flowers, calyx without conspicuous angles or veins, and anthers much exceeding the filaments. Some of the characters resemble those of *Athenæa;* in that genus, however, the fruiting calyx is much more deeply divided.

HERPESTIS AURICULATA. Roots fibrous; stem erect, smooth, sharply 4-angled, much branched above, a foot high; branches mostly simple: leaves lanceolate, acute, serrulate, sessile with an auriculate-clasping base, punctate, 8 to 10 lines long, 3 lines broad; floral leaves gradually reduced to linear bracts 2 to 3 lines long: flowers small, axillary, mostly in pairs, opposite at each node; pedicels filiform, 3 lines long; divisions of the calyx acuminate, a line long, becoming $1\frac{1}{2}$ lines long in fruit, very unequal in breadth, three of them ovate, the inner two rather narrowly lanceolate, none of them at all oblong; corolla purplish, 3 lines long, slightly bearded within near the summit of the tube; rudimentary stamen present, very small, subulate: capsule depressed-ovoid, subglobose, not exceeding the calyx, 2-valved. — Wet places near Guadalajara; November, 1889 (n. 2937).

GERARDIA PUNCTATA. Stem puberulent, much branched: leaves small, numerous, opposite or appearing fascicled, linear, entire, acute, smooth, 7 to 10 lines long, a line or less in breadth; bracts similar: flowers rather numerous, opposite in long subspicate racemes; pedicels 1 to 2 lines long: calyx smooth, 10-nerved, often punctate with small purple dots, the five teeth lanceolate, acuminate, exceeding the tube, the intermediate nerves terminating at each sinus in a minute glandular prominence; corolla purple, tubular-campanulate, an inch long, the lobes a fourth as long as the tube; stamens conspicuously didynamous, the upper pair being much shorter and having considerably

smaller anthers than the lower; filaments glabrous; anthers hirsute, mucronate at the base of each cell: style puberulent; capsule ovate, acuminate, equalling the calyx-lobes; seeds oblong, light brown, the external seed-coat loose, cellular, and iridescent. — Hills of Zacatecas; October, 1888 (n. 2183).

CASTILLEIA MACROSTIGMA. Perennial, 8 inches to a foot high, nearly smooth or more or less hispid with weak spreading hairs: leaves small, rather numerous especially at the base, linear, acute, entire, subamplexicaul, 1–3-nerved, 9 to 15 lines long, seldom exceeding a line in breadth; floral leaves broader and shorter, lanceolate or narrowly ovate, angled or sparingly toothed toward the apex, often yellow-tipped: flowers closely sessile in a short spike, slender, 8 to 12 lines long, surpassing the bracts; calyx light yellow, equally cleft before and behind, the lobes emarginate or two-toothed; corolla a third longer than the calyx, yellow, the lower teeth linear, acuminate, erect: stigmas conspicuously exserted, thickish, sometimes more than a line long, recurved. — Grassy slopes, Flor de Maria, Mexico; July, 1890 (n. 3194). This appears to be the same as Mr. Pringle's n. 1545 from Chihuahua, which was distributed under the provisional and unedited name of *C. lithospermoides*, HBK., var. (?) *flava*, Watson. Specimens of this number differ from 3194 chiefly in being more hispid and in having the stigmas less prominently exserted, which differences may be in part due to the less advanced stage of development. Both plants differ from *C. lithospermoides* in the size and color of the corolla, in the deeply cleft conspicuously exserted stigma, and also in the shorter relatively thicker and more coarsely reticulated seeds.

RUELLIA BOURGÆI, Hemsley. The mature capsules of this species, which were wanting in the type specimens and could not therefore be described, are excellently shown in Mr. Pringle's n. 2951 (barranca near Guadalajara, September, 1889). They are rigid, lanceolate, acutish, cuspidate, glabrous, 2 to $2\frac{1}{4}$ inches long and $\frac{1}{2}$ inch broad, the valves with a conspicuous median furrow; hooks ascending, bifid; seeds orbicular, nearly 3 lines in diameter.

JUSTICIA PRINGLEI. Herbaceous, 2 feet high, hirsute with spreading white hairs: leaves ovate, acuminate, entire, petiolate, $1\frac{1}{2}$ to $2\frac{1}{2}$ inches long, half as wide; the lowest smaller, orbicular, obtuse: flowers small, distant, borne in a spreading panicle; lower bracts foliar, ovate, the upper much smaller, lanceolate; bractlets minute, awl-shaped, half the length of the calyx; calyx-teeth 4, narrowly linear, attenuate, $2\frac{1}{2}$ to 3 lines long; corolla 4 to 5 lines long, pale rose-color, the limb nearly equalling the tube, the upper lip narrowed to a retuse summit,

the lower lip rounded: anther-cells nearly equal in size, the upper not ciliate, minutely mucronate at the base, the lower with a conspicuous spur: capsule 5 lines long, soft-pubescent, 4-seeded; seeds compressed, very hairy especially at the edge. — On hills near Guadalajara; October, 1889 (n. 2967). This species seems anomalous among the New World members of the genus. It resembles more nearly the species of the § *Rhaphidospora* of the Old World, which have a diffuse inflorescence and echinate-hispid seeds. It differs from § *Sarotheca* chiefly in lacking the ciliation of the anthers.

CITHAREXYLUM BERLANDIERI. Ten to fifteen feet high; branches gray, striate; branchlets pubescent, striate, acutely 4-angled but soon becoming round; leaves ovate or rhombic, varying in the same individual from acute to retuse at the apex, shortly cuneate at base, membranaceous, puberulent above, soft-pubescent beneath, 1 to $1\frac{3}{4}$ inches long, 9 lines broad, entire, or some with a few blunt teeth near the apex: inflorescence terminal, subspicate, more or less flexuous, 1 to 2 inches long, becoming more rigid in fruit; pedicels half a line long, with minute filiform bractlets of the same length: calyx turbinate, 2 lines long, striate, pubescent, the five subequal teeth erect, very short and blunt; corolla-tube just equalling the calyx, pubescent within, the spreading limb of five rounded lobes, puberulent on both sides: fertile stamens four, filaments hairy; the fifth stamen present as an antherless rudiment: drupes dark brown, as large as peas, crowded in the spikes. — Rocky hills, Las Canoas, San Luis Potosi; July, 1890 (n. 3222). Apparently identical with n. 3182 of Berlandier, collected near Matamoras, May, 1832. This specimen of Berlandier's was doubtfully referred by Dr. Gray to *C. villosum*, Jacq., and has formed the sole evidence that this species occurs in Mexico. In the light of Mr. Pringle's better material, however, it is clear that the Mexican plant is quite distinct from the species just mentioned.

SCUTELLARIA HISPIDULA. Perennial with ligneous base; stems numerous, mostly simple, hispidulous, a span high, often dark purple as well as the floral leaves and calyx: leaves small, ovate or ovate-elliptic, subglabrous or very minutely hispid but not at all cinereous-pubescent, 4 to 5 lines long (about half the length of the internodes), 2 to 3 lines broad, all except the very lowest abrupt at the base and sessile: flowers numerous, of medium size, with short pedicels; calyx strongly accrescent, hispid with short white hairs; corolla blue, white in the throat, soft-pubescent on the outside, 5 to 7 lines long, the upper lip but slightly cucullate; upper stamens often exserted. — Meadows, Flor de Maria, Mexico; August, 1890 (n. 3233). A plant with the habit

of *S. Drummondii*, Benth., and *S. Wrightii*, Gray, but distinguished from the former by its ligneous base and clearly perennial nature, and from the latter by the form of the leaves, character of the pubescence, smaller blue flowers, and less cucullate upper lip. While it may ultimately prove to be a variety of *S. Wrightii*, such a disposition of it in the absence of connecting forms and with the difference of geographic occurrence would at present be unwarranted.

MIMULUS CONGDONII. Very small, at flowering subacaulescent; stems glandular-pubescent, becoming in fruit 1 to 4 inches high, much branched near the base; branches simple: leaves ovate or lanceolate, obtuse, entire, dark purple beneath, ½ an inch long, narrowed at base to ciliate petioles of nearly equal length; peduncles in fruit 1½ to 2 lines long, often reflexed: flowers very small; calyx-tube very slender, prismatic, glandular-puberulent, moderately gibbous at base, becoming strongly so in fruit, ending obliquely in short teeth, the upper tooth the longest; corolla rose-purple, the slender tube 4 to 6 lines in length, with little or no distinctly enlarged throat, the subregular abruptly spreading limb 1½ to 2 lines in diameter; stamens strongly didynamous, the upper pair much shorter and occasionally with abortive anthers: style puberulent above; capsule cartilaginous, very gibbous, laterally compressed, narrowed from a moderately broad base, acute, deeply furrowed on the sides; seeds minute, acute at each end.—Collected by Mr. J. W. Congdon, in Mariposa County, California, at Zimmerman's Ranch, in March, 1887, in April, 1888 (flowers and fruit), and in May, 1888 (fruit); also at Stockton Creek, March, 1889 (flowers); and at Agua Fria (fruit). The diminutive size and nearly acaulescent character of flowering specimens of this plant made it at first appear probable that it represented merely a dwarfed, early-spring form of one of the larger-flowered species. The constant characters of Mr. Congdon's specimens, however, collected as they were at different dates and localities, and representing very different stages of development, prove it a normal form and a distinct species. While the vegetative habit is much like that of *M. Kelloggii*, Curran, it is distinguished from that species by its much shorter corolla-tube and smaller limb, as well as by its acute and not at all oblong capsules. From *M. pulchellus*, Greene, it differs in its smaller rose-purple corolla without the yellow lip, in its much shorter calyx-teeth, and in other ways. In its short corolla-tube and very gibbous capsule it resembles *M. latifolius*, Gray, but differs in its smaller size, in its habit of branching from the base, (the stem of *M. latifolius* although branching above is simple below,) in its very slender calyx-

tube, longer and usually reflexed peduncles, and relatively slender and more acute capsules. Like *M. latifolius*, this species is somewhat intermediate between §§ *Œnoe* and *Eunanus*.

MIMULUS GRACILIPES. A delicate annual, 3 to 5 inches high; stem usually simple, glandular-puberulent under a lens: leaves about four pairs, very small, seldom exceeding 4 lines in length, sessile, lanceolate, obtusish or scarcely acute, entire or minutely denticulate, the roundish cotyledonary (?) leaves persisting at base: peduncles springing by pairs from each node, an inch long, filiform, spreading horizontally and gracefully curved upward: calyx oblong-campanulate, a little over 2 lines in length, a line in diameter, the equal teeth slightly spreading, obtuse, strongly ciliate; corolla rose-purple with yellow markings in the throat, the tube not quite twice the length of the calyx; limb spreading, 3 or 4 lines in diameter, strongly bilabiate, the upper lip much shorter than the ample 3-lobed lower one: capsule symmetrical, of delicate texture, elliptical in outline, 2 lines in length, included in the scarcely inflated calyx; seeds obtuse, apiculate at each end. — Collected by Mr. J. W. Congdon, at Mormon Bar, Mariposa County, April, 1889. Near *M. rubellus*, Gray, and *M. deflexus*, Watson, but differing from the former in its simple stem, much larger corolla, and longer peduncles; from the latter in the color of its corolla; and from both these and various other related species in its ciliate calyx.

ASTER ENGELMANNI, Gray, var. (?) PAUCICAPITATUS. Slender; stem weak and flexuous: leaves numerous, oblong-elliptic, obtusish, apiculate, puberulent above and with scanty traces of tomentum beneath, 10 to 15 lines long. a fourth as broad: heads solitary, terminal, or sometimes 3 to 5; scales of the involucre more equal and less closely imbricated than in the typical form or other varieties; rays white or pink. — Collected by Mr. C. V. Piper in the Olympic Mountains, Washington, September, 1890. This is a very puzzling form and perhaps a distinct species. If, however, Dr. Gray was right in classing *A. ledophyllus*, Gray, and *A. Engelmanni*, var. *glaucescens*, as varieties of the same species, Mr. Piper's plants, which are in some regards intermediate between these varieties, should probably also be included in *A. Engelmanni*.

In closing, the writer wishes to express his warmest thanks to Dr. Sereno Watson for his kind and ready aid in many points of difficult classification and perplexing nomenclature.

Contributions from the Gray Herbarium
of Harvard University. New Series No. II

DESCRIPTIONS OF NEW PLANTS COLLECTED IN MEXICO BY C. G. PRINGLE, IN 1890 AND 1891, WITH NOTES UPON A FEW OTHER SPECIES.

By B. L. ROBINSON.

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XII.

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N. S. II.

DESCRIPTIONS OF NEW PLANTS COLLECTED IN MEXICO BY C. G. PRINGLE IN 1890 AND 1891, WITH NOTES UPON A FEW OTHER SPECIES.

By B. L. Robinson.

Presented by George Lincoln Goodale, June 15, 1892.

Cleome Potosina. Herbaceous, two feet high: stem purplish, striate, moderately branched, minutely glandular-pubescent, armed at the nodes with pairs of small stipular spines: leaves trifoliate; petioles minutely but densely glandular-pubescent, 1–1½ inches in length; leaflets ovate-lanceolate or narrowly rhombic, mostly acute or acuminate at the apex, acute at the base, puberulent under a lens and minutely ciliate, 1–1½ inches long, 5–8 lines broad: floral leaves numerous, simple, lanceolate or ovate-lanceolate, subsessile, 4–6 lines in length: peduncles slightly puberulent or smooth, about 9 lines long: sepals linear-subulate, acute, reflexed during anthesis: petals spatulate, white, 5 lines in length, the blade about equalling the slender claw: stamens variable, sometimes very unequal in the same flower, some or all of them much exceeding the petals: stipe of the ovary 6–10 lines long; capsule linear, pointed at each end, moderately curved, smooth, but with a fine longitudinal striation, 1¼–1½ inches in length, 1½–2 lines in thickness: seeds striate and muricate.—Tamasopo Cañon, San Luis Potosi, June, 1890 (n. 3538). Near the South American *C. diffusa*, DC., but distinguished by the long stipe of the ovary, slender-clawed petals, long stamens, and longer linear pods. It is also near *C. aculeata*, L., but is amply distinguished by its long-stiped ovary and much exserted stamens.

Viola reptans. Rhizome short, bearing long fibrous roots: stems numerous, glabrous, prostrate, 6–10 inches long, rooting at the nodes: radical leaves broadly ovate, suborbicular, obtuse or rounded at the apex, cordate, regularly crenate-serrate, smooth on

both sides, slightly ciliate on the margin, white-punctate above, paler beneath, $1\frac{1}{2}$ inches long, $1\frac{1}{4}$ inches broad; petioles 1-3 inches long, pubescent on the upper surface; cauline leaves smaller, ovate, subcordate, more inclined to be pointed: stipules narrow, either subentire or cleft into 2–3 linear acuminate segments: peduncles glabrous: sepals lance-oblong, obtuse or acutish: petals white lined with blue, smooth: valves of the mature capsule 4 lines long, twice the length of the sepals: seeds dark, smooth, and shining. — Hills of Patzcuaro, Michoacan, November, 1890 (n. 3591).

Xylosma Pringlei, Rob. (P. A. A., XXVI. 164). Additional specimens of this species collected at Las Canoas, San Luis Potosi, June and July, 1891 (n. 3727), give the following supplementary characters. The mature (?) fruit red, spherical, 2 lines in diameter, slightly elevated in the spreading calyx, crowned with the short styles, 1–2 seeded.

Kosteletzkya digitata, Gray. Mr. Pringle's no. 3622, from Tamasopo Cañon, San Luis Potosi, collected in June, 1890, appears identical with the type of this species discovered by Dr. Palmer on the Yaqui River, Sonora, 1869. Mr. Pringle's specimen shows the plant to be erect and over two feet in height. The cauline leaves are divided into three linear-oblong, subequal lobes, and have in addition two smaller auricles at the base; the leaves of the branches are simply linear, or have auricles of varying length at the base. The flowers in a dried state appear to be white with a yellow tint.

Casimiroa edulis, Llav. & Lex. Mr. Pringle's no. 3861, from near Guadalajara, represents a form of this species with rather narrow sessile leaflets but three in number.

Æschynomene petræa. A tall erect annual, 4–5 feet in height: stem subsimple, slender, finely striate, nearly smooth: leaves alternate, appressed-silky especially when young, 2–3 inches long; leaflets 15–25 pairs and an odd one, oblong, obtuse, sharply mucronate, 3–4 lines in length: stipules linear, very acute, 1–3 lines long: inflorescence subterminal or the flowers crowded on short, very glandular-pubescent lateral axes; bracts very small, ovate, acute, very pubescent, deciduous: pedicels short, 2–3 lines in length, they and the calyx glandular-pubescent or hirsute: corolla yellow, striped with purple: pod stiped, very deeply parted into 2–4 almost semicircular segments, pubescent especially on the edges and at the nodes; segments thin, flat, 3 lines in diameter, somewhat veiny, but the veins not prominent. — Rocky hills near

Guadalajara, May, 1891 (n. 5147). I am indebted to Mr. Hemsley for the information that this plant is distinct from *Æ. conferta*, Benth., and that it appears to be the same species as Seemann's 2189, collected in the Sierra Madre. In the Gray Herbarium there is a similar plant collected by Seemann in the Sierra Madre, and probably representing his 2189. It certainly seems to be specifically the same as Mr. Pringle's plant, although it represents a somewhat different stage of growth. In it the leaves arise from the stem, and the inflorescence is hirsute and less glandular. In Mr. Pringle's plants the stem-leaves have all fallen, and the entire foliage is crowded upon short secondary axes, giving the specimens a rather different habit.

VIGNA LUTEOLA, Benth., var. ANGUSTIFOLIA. Stem appressed-pubescent: leaflets lance-linear, rounded at the base, 1½–2 inches long, about 3 lines broad: petioles short, not an inch in length.—Wet places near Guadalajara, May, 1890 (n. 3488).

VIGNA STROBILOPHORA. Stem slender, flexuous, branched, covered with a fine soft pubescence: leaves pinnately trifoliate; leaflets ovate, acuminate, entire, rounded at the base, pubescent or glabrate above, somewhat paler and soft-pubescent beneath, 2½ inches long, half as broad; common petioles pubescent, 1½ inches in length: peduncles axillary, rather stout, curved, bearing the flowers in dense racemes: bracts large, ovate, sharply acuminate, entire, scarious, finely striate, somewhat pubescent and ciliated toward the apex, closely imbricated over the buds, deciduous: pedicels single, silky-pubescent, 1–3 lines long: calyx campanulate, short, colored; teeth short and obtuse: corolla blue-purple, 6–7 lines in length; standard orbicular, slightly retuse, with two scale-like appendages at the base; wings bluntly auriculate on the upper side; keel bent nearly at right angles, the end then conspicuously curved inward: stamens diadelphous: style bearded on the outer side near the end; stigma somewhat oblique. — Bluffs of barranca near Guadalajara, September, 1891 (n. 5163). This species is strongly characterized by its large closely imbricated bracts. In its keel it is almost intermediate between Phaseolus and Vigna.

CÆSALPINIA MULTIFLORA. A medium-sized tree, minutely sericeous on the younger parts: foliage and racemes crowded near the ends of the branches; leaves 7 inches or more in length, bipinnate; pinnæ about 10 pairs; common petiole striate-sulcate, 3 inches long; leaflets 15–18 pairs, elliptic-oblong, mucronate, entire, mod-

erately oblique at the base, 4–6 lines in length, 1½–2 lines in breadth, paler beneath: racemes numerous, many-flowered, 6 inches or more in length, flowering from near the base: flowers early deciduous, leaving the rhachis naked below: pedicels 4–5 lines long, articulated somewhat above the middle: calyx-teeth subequal, ovate-oblong, smooth, yellowish brown, subcoriaceous, distinctly but narrowly imbricated, 2–2½ lines long, reflexed in anthesis: petals bright yellow, obovate, erose, 4–5 lines long, one of them with a slightly narrower blade and broader claw, and bearing a small crest-like appendage on the inside near the base: stamens erect, equalling the corolla; filaments silky near the base; ovary hirsute, about 6-ovuled: fruit not seen.— Volcanic hills, Monte Leon Pass, Michoacan, May, 1891 (n. 3730). The very narrow imbrication of the sepals tends to connect Cæsalpinia and Poinciana.

LOPEZIA ANGUSTIFOLIA. Somewhat woody near the base: stem purplish, nearly smooth, 2–4 feet high, giving off numerous slender spreading subsimple branches: cauline leaves not persistent, the lower not seen, the upper ones and those of the branches narrowly lanceolate, irregularly subserrate, glabrous, 5–10 lines long, 1–2 lines broad, pellucid-punctate, narrowed to a bluntish point, contracted at the base to a slender petiole (1½–3 lines in length), midrib often reddish: racemes numerous, terminating the stem and branches, not distinctly pedunculate; pedicels not exceeding 6 lines: calyx segments red, linear, narrowed to an obtuse point, the lowest somewhat broader: petals purple, the lower ones obovate, cuneate, 3 lines long, the upper with a linear-oblong blade, scarcely at all auriculate at the base; glands single, very slightly contracted in the middle: sterile stamen with filament not equaling the suborbicular retuse bright-red blade: fruit spherical, 2 lines in diameter.— Limestone ledges of Las Canoas, San Luis Potosi, October, 1891 (n. 3990).

COULTEROPHYTUM, n. gen. of the Umbelliferæ (Selineæ). Stylopodium slender, conical; margin not distinctly undulate. Fruit clavate, subterete in cross-section, contracted below the seeds into a short winged stipe-like base; commissure broad; carpels compressed dorsally; the primary ribs narrowly winged, the lateral wings slightly broader; oil-tubes single at the intervals, about four on the commissure; seed-face concave.— Tall perennial of robust habit; leaves bi- or tripinnate: inflorescence much branched; umbels compound: bracts of the involucres and involucels several,

small, filiform. This genus appears most closely related to Ligusticum, differing from it chiefly in the more slender conical stylopodia, solitary oil-tubes, carpels dorsally flattened, and fruit contracted below. In its habit and lax inflorescence it somewhat resembles Arracacia, but its much broader commissure and the form of the seed would place it rather among the Selineæ. I take pleasure in dedicating the genus, at the desire of the discoverer, to Professor John M. Coulter, who with Mr. J N. Rose has so carefully elaborated the North American species of this difficult order. To Mr. Rose I am indebted for kind assistance in determining the generic affinities of the plant here described.

C. LAXUM. Stem somewhat woody, 5–10 feet high, an inch in thickness, with prominent nodes: leaves bi- or tripinnate, 18 inches in length, with enlarged sheathing petioles; leaflets ovate or ovate-lanceolate, serrate, acuminate at the apex, rounded at the base, almost smooth above, pubescent on the veins beneath with minute stiff hairs: inflorescence lax, several times branched, branches bearing compound umbels with 6–12 rays: bracts of the involucre 1–4, sometimes wanting, short, filiform; bractlets similar, usually more numerous: fruit 4 lines long; the contracted base a line in length: flowers not seen. — Bluffs of barranca near Guadalajara, September, 1891 (n. 3831).

OLDENLANDIA PRINGLEI. Cæspitose: stems ascending or prostrate, subsimple or considerably branched, usually springing from elongated scaly rhizomes: leaves pseudo-verticellate, in groups of 4–8, linear, acute, appearing somewhat fleshy: flowers borne in rather loose terminal cymes: pedicels 1–3 lines in length: corolla salver-formed, 4-lobed, 2–2½ lines long, purple in a dried state: stamens and pistil dimorphous; anthers either inserted on the middle of the tube or just exserted from its summit: ovary entirely inferior, crowned in fruit by the lanceolate approximate calyx teeth; these almost equalling the capsule in length: seeds smooth, numerous, obtusely angulate, not concave.— Alkaline plains, Hacienda de Angostura, San Luis Potosi, June, 1891 (n. 3758). A plant of almost equal affinity to Oldenlandia and Houstonia, possessing the numerous small angulate smoothish seeds and entirely inferior ovary of the former, but the dimorphous flowers and linear anthers of the latter.

CRUSEA MEGALOCARPA, Wats (P. A. A., XXVI. 137), *Spermacoce megalocarpa*, Gray (Ibid., XXI. 381). Mr. Pringle's specimens of this species being in flower, the floral characters.

which seem never to have been described, may now be given. Corolla smooth and (in a dried state) purplish-blue, 6 lines long; tube very slender; limb of 4 linear-oblong lobes, spreading or moderately reflexed: stamens and pistil conspicuously exserted, anthers blue, curved, versatile.—On dry talus of cliffs in shade, barranca near Guadalajara, September, 1891 (n. 3852). The elongated corolla fully confirms Dr. Watson's view that this is a Crusea, and not a Spermacoce.

VALERIANA ALBONERVATA. Tuber two inches in diameter: stem erect, two feet in height, sulcate-striate, pubescent, subsimple up to the branched inflorescence, nearly leafless: radical leaves numerous, pinnate; leaflets 3–4 pairs and an odd one, broadly obovate or suborbicular in outline, sometimes an inch in diameter, mostly smaller, cuneate at the base; limb more or less divided into 3–5 broad rounded lobes; the edges and veins beneath covered with a short and dense white pubescence: petioles pubescent, 2–4 inches long; cauline leaves 1–2 pairs, distant, much reduced: inflorescence regularly dichotomous; bracts awl-shaped, 1–1½ lines long: flowers small; corolla a line wide, scarcely half as long: stamens exserted: fruit ovate, glabrous, 2 lines long, crowned by the spreading plumose calyx-teeth of the same length.—Hillsides, San José Pass, San Luis Potosi, July, 1890 (n. 3612).

EUPATORIUM FILICAULE, Schultz Bipontinus. Stem slender, terete, striate, the upper part covered with a very short close pubescence: leaves opposite, membranaceous, petiolate, ovate, sharply acuminate, subcordate or somewhat hastate, serrate, nearly or quite glabrous on both surfaces, 2 inches long, 1¼ inches wide: petioles flexuous, pubescent, 9 lines or more in length: inflorescence of slender opposite spreading branches, bearing numerous sub-racemose heads: pedicels filiform, 1–1½ lines long, fasciculately grouped upon the branches: bracts filiform: heads 2½ lines long: scales of the involucre 9–12, linear-oblong, sharply acuminate, the two or three outermost much shorter than the others, all thin, striate, tending to turn purple, minutely pulverulent-pubescent: achenes somewhat clavate, puberulent at the angles, narrowed below into a sort of stipe.—Near *E. Palmeri*, Gray, but differing in its more delicate foliage, more racemose heads, and in the achenes attenuated downward. This and the following seem to be good species, which were named by Schultz Bipontinus, but, so far as I have yet been able to learn, were never described. The description above is drawn, not from the type which is Ehrenberg's no. 1176

(in the Berlin Herbarium), but from a specimen collected by Schaffner in Orizaba, October, 1855. The latter plant was identified with Ehrenberg's by Schultz himself, who employed the ! sign to express special definiteness. Bilimek's no. 576, Orizaba, May, 1867, and Bourgeau's 1703, Valley of Cordova, January, 1866, have been identified with this species by Dr. Gray. Mr. Pringle's plants collected on ledges of the Tamasopo Cañon, November and December, 1890 (nos. 3649 and 3956), are also certainly to be referred here, although the leaves are more deeply hastate.

EUPATORIUM SCHAFFNERI, Schultz Bip. Root a cluster of thickened fibres: stems 2–3, terete, pubescent, tending to turn dark purple, a foot or two in height, sparingly branched: leaves opposite, petiolate, ovate, crenate-serrate, acutish, truncate at the base, subglabrous, $1\frac{1}{4}$ inches long, an inch wide: petioles 4–7 lines in length, the upper shorter: heads corymbose, pedicellate, about 25-flowered, $1\frac{1}{2}$ lines long (somewhat immature): scales of the involucre equal, obtusish or more or less pointed, thin, sub-transparent, but with 2–3 strong nerves in the middle near the base: achenes immature.— Description drawn from the type collected by Schaffner in Mexico near S. Angelos, 1855 (n. 28). In the Gray Herbarium the following specimens may be referred to this species: Schaffner's no. 292 ex convalli San Luis Potosi, August, 1876; Parry and Palmer's 345, from a similar locality, 1878; and Pringle's 3662, Flor de Maria, Mexico, October, 1890. These specimens, which are more mature than the type, show the heads to be a trifle larger, the ripe achenes to be small, dark, scarcely contracted below, puberulent both on and between the angles.

EUPATORIUM LEMMONI. Stoloniferous: stems subsimple or much branched, terete, dark purple, with close white pubescence: leaves all opposite, sessile, mostly elliptic or ovate-elliptic, obtusish, 10–14 lines long, about half as wide, crenate-serrate (sometimes obsoletely so), glabrous above, sparingly pubescent upon the veins beneath: the lower leaves smaller, rounder; the uppermost more ovate and acute: heads $3\frac{1}{2}$ lines high, on peduncles half an inch in length: the sharply pointed nearly smooth scales of the involucre subequal: flowers rather numerous; corollas white; achenes somewhat puberulent.— First collected by Mr. J. G. Lemmon in the Chiricahua Mountains of Southern Arizona, 1881 (n. 316 in part); then by Dr. Edward Palmer in Southwestern Chihuahua, August to November, 1885 (n. 332); and by Mr. Pringle on cool rocky slopes of the Sierra Madre, September, 1887

(n. 1264). Mr. Lemmon's specimens were supposed by Dr. Gray to belong to *E. Rothrockii*, with which they had been associated, and it is to them that he referred (Syn. Fl. I. 2. 102) in speaking of depauperate forms of *E. Rothrockii* with sessile leaves.

XANTHOCEPHALUM TOMENTELLUM. Perennial, 2–3 feet high: stem simple, leafy up to the corymbose inflorescence, striate, tomentulose: leaves entire, thickish, pale green, glabrate above, tomentulose beneath; the radical ones oblanceolate or spatulate, rounded at the apex or obtusely pointed, 2–2½ inches in length, narrowed at the base to petioles 3–4 inches long; the cauline oblanceolate; the lower contracted below into broad more or less clasping petioles; the upper sessile, acute: branches of the inflorescence angulate, bearing the heads in rather dense terminal corymbose groups: heads 2½–3 lines long, about as broad; involucre campanulate; scales regularly imbricated in several rows, abruptly pointed, the scarcely thickened ends appressed or slightly spreading: rays numerous, not exceeding the disk flowers: pappus in both ray and disk flowers a crown of short unequal scales more or less united into a cup; achenes glabrous, 2-edged, with or without one or two intermediate angles.—Alkaline meadows, Hacienda de Angostura, San Luis Potosi, July, 1891 (n. 3761).

BELLIS PURPURASCENS. Perennial: root of numerous fibres: stem procumbent, much branched, angulate, striate, covered with spreading white pubescence: branches simple or again divided, terminating in long slender simple peduncles: leaves elliptic lanceolate or the lower somewhat spatulate, acute or acutish, entire, sessile tending to turn purple, 8–18 lines long, 3–5 lines broad, pubescent on both sides and ciliate: heads including the rays 7–8 lines in diameter: involucre spreading, the bracts in two series, lanceolate, acuminate, herbaceous in the middle, with margins somewhat scarious (not so distinctly so as in *B. integrifolia*): rays purplish white: disk deep yellow.—Shaded grassy slopes, barranca of Las Canoas, San Luis Potosi, August, 1891 (n. 3819). This plant was distributed as *B. xanthocomoides*, Gray (*Brachycome xanthocomoides*, Less.), the material of that species in the Gray Herbarium being insufficient to prove the distinctness of Mr. Pringle's plant. I am indebted to Prof. N. L. Britton for definite information on the subject, and for the kind loan of Schiede's no. 206 from the Herbarium of Columbia College, which shows *B. xanthocomoides* to be certainly distinct, differing in its much less robust and branching habit, its solitary heads, long slender runners, more

decidedly spatulate leaves, and the absence of the coarse spreading pubescence.

ERIGERON HETEROMORPHUS. Amphibious, glabrous throughout: stems dark-colored, subsimple, rooting for some distance along a decumbent base: leaves of two very distinct forms, those of the terrestrial specimens three-lobed to the middle, sessile by a cuneate base, 2 inches long, an inch or more broad; the lobes laciniately cleft: leaves of the sterile aquatic stems linear, elongated, subentire or more or less divided, 4 inches or more in length: heads including the rays 7–8 lines in diameter, borne singly on peduncles 3–4 inches in length: involucre of subequal moderately imbricated flat smooth green subulate scales with very narrow scarious margins: rays about 50, narrow, pure white.—Growing from calcareous tufa, more or less submerged, Cascades of the Concepcion River near Micos, San Luis Potosi, December, 1891 (n. 3963). A remarkable species near *E. scaposus*, DC., but strongly characterized as well by the smooth green scales of its involucre as by the presence of the floating leaves.

MELAMPODIUM LONGIPILUM. A span or more high, cymosely branched almost from the base: stem rather stout, the young internodes white with soft long spreading hairs, the older parts pilose but much less densely so: leaves ovate or somewhat rhombic, obtuse or rarely acute, contracted at the base and narrowly connate, entire, appressed-pubescent, punctate, 2–$2\frac{1}{2}$ inches long, half as wide: peduncles slender, very pubescent: bracts of the involucre distinct, obovate, pointed, hirsute over the whole outer surface: rays about 10, deep yellow, 2–3 lines in length: fertile bracts laterally tuberculate-roughened, bearing a small acuminate recurved appendage at the summit: disk somewhat elevated in the centre.—San José Pass, San Luis Potosi, July, 1890 (n. 3639). This plant stands very near *M. divaricatum*, DC., of which it may possibly prove to be a well marked variety. It differs, however, in its very hairy stem, and in its involucral bracts, which are not only narrower and more acute, but are pubescent-hirsute over the entire outer surface, instead of being merely ciliate, as in *M. divaricatum*. Furthermore, the leaves are entire and incline to be more obtuse, while the fertile bracts are very tuberculate and are provided with longer appendages.

SABAZIA MICHOACANA. Perennial, 2–3 feet high: stem slender, purple, hirsute-pubescent, somewhat branched, springing from a short horizontal rootstock: leaves opposite, ovate-lanceolate, ser-

rate, acute at the apex, obtusish at the base, more or less distinctly 3-nerved, pubescent above, canescent-tomentose over the whole surface beneath, 1½–2 inches long, 7–9 lines broad: petioles short, pubescent; bracts of the loose corymbose inflorescence small, lance-linear, 3–4 lines long: heads about a dozen, including rays 6–8 inches in diameter: scales of the involucre ovate, acute, the outer somewhat shorter, the inner longer, narrower, more oblong and more acute, but scarcely acuminate: rays about 10, white, tube hirsute-pubescent, ligula broadly elliptic, 3-toothed, 3 lines long: disk flowers yellowish white (?), tube hirsute-pubescent, limb 5-toothed: anthers entire at the base: style tips with short blunt appendages: achenes small, black, oblanceolate in outline, hispidulous: pappus none. — Mountains near Patzcuaro, Michoacan, November, 1891 (n. 4099). Distinguished from *S. Liebmanni*, Schultz Bip. ex char.,* by having heads loosely corymbose, not solitary, leaves ovate-lanceolate not elliptic, tomentose over whole surface beneath instead of along the nerves.

GYMNOLOMIA CANESCENS. Stem striate-furrowed, branched, leafy below, nearly leafless above, clothed with a close gray more or less deciduous pubescence, and sparingly villous: leaves opposite, ovate, subcordate, entire, acute or obtuse, triply nerved, 2–3½ inches long, roughish-pubescent above, canescent beneath with silky appressed hairs; petioles 6–8 lines long: inflorescence of several slender naked branches, each bearing 1–8 rather closely aggregated heads (4–5 lines in diameter): pedicels and bracts of the involucre canescent, the latter lanceolate, acuminate, rather loosely imbricated in 2–3 series, the outer somewhat shorter: rays 5–7, yellow, not exceeding the disk: chaff ovate-lanceolate, carinate, terminating in acute pubescent points, with or without lateral teeth: style branches of the disk flowers with rather attenuated tips: achenes dark, mottled with light color: pappus none. — Brackish marsh, Las Tablas, San Luis Potosi, June, 1890 (n. 3611), and alkaline plains, Hacienda de Angostura, San Luis Potosi, June, 1891 (n. 3763). This species differs from the other Gymnolomias which I have examined, in having more attenuated style tips, but it appears better placed in this genus than elsewhere.

TITHONIA BRACHYPAPPA. Stem terete, striate, smooth or nearly so, branched above: branches terminating in peduncles thickened

* Klatt in Leopoldina, XXIII. 2.

upward and subscabrous; cauline leaves alternate, 2–2½ inches in diameter, deeply 3-lobed, broadly cordate, scabrous above, pubescent beneath, lobes serrate, acuminate, the middle one more or less panduriform: petioles 9 lines long, winged: wings decurrent for some distance upon the stem: heads exclusive of the rays an inch in diameter: involucre hemispherical; bracts striate, with subfoliaceous tips, the outer shorter, rounded at the apex, the inner equalling or slightly surpassing the disk, acute: rays about 8–10, deep yellow, 9 lines long; chaff scarious, carinate, very sharply acuminate, with or without lateral teeth: achenes 4-angled but decidedly compressed, narrowed downward, dark in color, often mottled with light red: pappus none or in the same head consisting of a ring of short unequal rather rigid teeth.— Las Palmas, San Luis Potosi, October, 1890 (n. 3675). This plant has so perfectly the habit and characters of a Tithonia that it should certainly be referred to this genus notwithstanding its short sometimes obsolete pappus. From *T. tagetiflora*, Desv., it differs in its involucre; from *T. diversifolia*, Gray, in its considerably smaller heads and shorter rays, as well as in achenes and pappus.

Verbesina Potosina. Stem rather stout, furrowed, pubescent, leafy to the summit: leaves alternate, lance-oblong, attenuate, acute, sessile, auriculate, denticulate on the subrevolute edges, roughish pubescent above and finely dotted with the enlarged white bases of the hairs; white tomentose beneath, less so on the veins: heads rather numerous, 5–6 lines in diameter, loosely corymbose, peduncles pubescent, 1–3 inches in length: scales of the involucre lanceolate, sharply acuminate, canescent, rather loosely imbricated, not equalling the disk flowers; rays about 12, very small, scarcely exceeding the involucre, yellow: disk strongly convex: chaff scarious, keeled, pubescent near the acuminate tips: disk flowers deep yellow: achenes oblanceolate, 1½ lines in length, notched at the summit and with a slight angle on each face; wings moderately broad, upwardly ciliate, subacute above. — Mesas, Hacienda de Angostura, San Luis Potosi, July, 1891 (n. 5113). Near *V. auriculata*, DC. (ex char.), but differing in its radiate heads, narrower leaves, and lanceolate acuminate involucral scales.

Verbesina Pringlei. Fruticose: branches covered with a whitish cortex; branchlets strongly angled, glabrous or nearly so: leaves opposite, lanceolate, attenuate, acute, rather coarsely and irregularly serrate-dentate, of harsh texture, scabrous above, pubescent but scarcely rough beneath, 3–5 inches long, 1–1½ inches

wide, narrowed below to short petioles: cymes few-headed, scarcely or not at all exceeding the upper leaves: pedicels ½–1 inch in length, pubescent: heads discoid, orange-yellow, 5 lines high, about 12-flowered: bracts of the involucre about 10, the outer oblong or spatulate, obtuse, scarcely half the length of the flowers, the inner more or less acute: corolla hispidulous upon the outer surface: achenes black, with broad wings and two nearly erect awns: heads of fruit subglobose: the plicate chaff with bright yellow curved tips exceeding the achenes. — Dry rocky bluffs of barranca near Guadalajara, September, 1891 (n. 3845). This species differs from *V. serrata*, Cav., in its shrubby habit, narrower leaves, somewhat smoother stem, etc. Berlandier's no. 1289, collected at Monte San Juan del Rio, November, 1827, is evidently nearly related to Mr. Pringle's plant, but the specimen is too fragmentary for certain identification; there appear to be slight differences in the achenes, and the heads of Berlandier's plant do not have the chaff conspicuously curled in fruit.

SPILANTHES BECCABUNGA, DC., var. PARVULA. Root a cluster of thickened fibres: stems several, decumbent, 4–6 inches high, rooting at the lower joints: leaves ovate, entire, including petiole only 6–10 lines long, half as broad: heads a little smaller and rays shorter than in the typical form: anthers dark, slightly caudate at the base. — Wet soil, Flor de Maria, State of Mexico, August, 1890 (n. 3643). This may perhaps be a distinct species.

SPILANTHES DISCIFORMIS. Stem prostrate, woody, verrucose, rooting at the joints, and sending up numerous subsimple, more or less fleshy, glabrous, purplish branches: leaves lance-oblong or lance-linear, triply-nerved, entire, glabrous, 10–14 lines long, 1½–3 lines wide, usually considerably exceeding the internodes, narrowed to a blunt point, contracted below to a short, sometimes ciliated petiole: peduncles at the ends of the branches, striate, glabrous, 2 inches long: scales of the involucre ovate (not lanceolate nor oblong), acute, subciliate: rays yellow, inconspicuous, scarcely exceeding the involucre, the heads at first sight thus appearing discoid: receptacle much elevated: disk flowers yellow: anthers entire at the base: achenes black, ciliate at the angles, and slightly hispid on the faces, exaristate. — Wet meadows, near Guadalajara, May, 1890 (n. 3489). A stout, somewhat fleshy species, differing from *S. Beccabunga* in its more woody stem, narrower entire leaves, shorter rays, ovate scales, and entire anthers.

LEPTOSYNE PINNATA. Acaulescent: root of several thickened

fibres: the base of the plant covered with brown wool, as in some species of Cacalia: leaves including petioles a foot in length, pinnate, glabrous; leaflets 4–6 pairs and an odd one, elliptic-lanceolate, acute at each end; the terminal one much larger, 8–10 lines long, obscurely crenate, with minute glands in the sinuses of the crenation; scapes a foot high, simple or branched, bearing one or more linear bracts: involucre double, the outer bracts narrowly oblong, exceeding the broader inner ones, all obtuse: heads solitary, exclusive of the rays ½ inch in diameter: rays white, 4–5 lines long, fertile: disk flowers yellow, their corollas destitute of an annulus at the junction of the tube and throat: achenes slightly ciliate on or near the summit, but without a distinct pappus. — Wet meadows, Del Rio, State of Mexico, August, 1890 (n. 3668). This plant approaches most nearly the genus Leptosyne, differing from it, as heretofore limited, chiefly in its white rays and in the absence of an annulus on the disk corollas. The neighboring genera, Dahlia and Bidens, show, however, what variation is to be expected in the color of the rays, and in *L. Mexicana*, Gray, which Dr. Gray pronounces a good Leptosyne, there is scarcely a trace of an annulus. Mr. Pringle's plant is certainly very distinct in its habit from any known species of the genus.

GEISSOLEPIS, n. gen. of the Compositæ (Galinsogeæ). Heads heterogamous, radiate. Flowers all fertile, rays white, disk yellow. Involucre turbinate-campanulate; scales ovate, obtuse, closely imbricated in 4–5 rows, the outer regularly shorter. Receptacle chaffy in all parts, but not alveolate; chaff obovate, obtuse, ciliate. Disk flowers regularly 5-toothed, throat not enlarged. Anthers entire below. Style divided nearly to the middle; the branches flattened, bearing short conical appendages. Achenes 4-angled, pubescent, crowned with 7–8 very acute awl-shaped, minutely and retrorsely ciliated scales. — A prostrate, somewhat succulent herb, with alternate entire linear leaves: heads small, solitary on lateral peduncles arising opposite the leaves. This genus is perhaps best placed just before Blepharipappus. The generic name, derived from *γείσσον* and *λεπίς*, has reference to the well imbricated scales of the involucre, one of the distinctive characters of the genus.

G. SUÆDÆFOLIA. Stems prostrate, giving off numerous subsimple branches: branches 4–6 lines in length, finely pubescent, especially at the nodes: leaves glabrous, fleshy, 6–8 lines long, half a line in breadth, sessile: heads including rays 8 lines in

diameter; rays elliptic, 3-toothed, 2–3 lines in length. — Alkaline plains, Hacienda de Angostura, San Luis Potosi, June, 1891 (n. 3762).

Flaveria anomala. A glabrous annual, a span high: stem striate-angulate, much branched: leaves linear or lance-linear, gradually narrowed to a slightly connate base, acute, $1\frac{1}{2}$–2 inches long, $1\frac{1}{2}$–$2\frac{1}{2}$ lines wide: heads numerous, aggregated at the ends of the branches in dense corymbs, very small, subtended by minute dark-tipped bracts, 1- (rarely 2-) flowered; the single flower either tubular or ligulate: involucral scales of unequal breadth, lance-linear or oblong, more or less narrowed but obtuse at the apex, persisting in fruit and becoming swollen and bulbous on the back near the base: corollas bright yellow; in the tubular flowers the campanulate throat and spreading limb equalling the tube, the latter hairy on the outer surface; the ligules a line or less in length: achenes oblanceolate, ribbed, black. — Plains, Vanegas, San Luis Potosi, September, 1890 (n. 3669). This interesting plant was first collected by Dr. C. C. Parry in Northern Mexico, 1878 (n. 31), and again the same year *en route* from San Luis Potosi to San Antonio, Texas (n. 500); but Dr. Parry's specimens were determined (probably by Mr. Hemsley) as *F. linearis*, Lag. "forma morbida." Dr. Gray noted the specimens as a new species, but appears never to have described them. Mr. Pringle's plants, collected twelve years later and agreeing closely with Dr. Parry's, seem to show that they represent a permanent species, and not merely a casual form. In its very few-flowered heads this species approaches *F. repanda*, Lag.

Porophyllum Pringlei. A smooth pruinose annual, $1\frac{1}{2}$–2 feet in height: stem terete, simple below, branching above: leaves elliptic, subentire, with rounded apex and acute base, delicate in texture; the cauline mostly opposite, 1–2 inches long, half as broad, on slender petioles of nearly equal length; the rameal mostly smaller, inclining to be alternate: glands of the leaves few, all marginal, broadly elliptic, light brown: heads rather few, scattered, 9 lines in length, tapering and very acute in bud: scales of the involucre narrow, $\frac{3}{4}$ of a line in breadth, acuminate, with scarious margins and a single median row of glands: peduncles arising singly: flowers few, about 12, little or not at all exceeding the involucre: corolla tube very slender, about equalling the achene in length; the limb very small, nearly white. — Barranca near Guadalajara, September, 1889 (n. 2954); also in a similar locality, October, 1891 (n. 5168). This species is near *P. Ervendbergii*,

Gray, but differs in its scattered, not at all cymose heads, and larger, thinner entire leaves glandular only on the margins.

Cnicus excelsior. Very tall, 6–10 feet high: stem ribbed, partially covered with a deciduous arachnoid pubescence: lower leaves lanceolate, acute, subentire, somewhat repand toward the base, spinulose-ciliate, 8 inches long, 2 inches broad, narrowed below into a petiole 2–3 inches in length, pale green and more or less arachnoid above, covered beneath with a thin gray arachnoid tomentum; cauline leaves sometimes a foot or more in length and 5 inches in breadth, sinuate-pinnatifid, with triangular, acute lobes, spinulose on the edges, sessile and conspicuously decurrent in broad wings (3–4 inches in length): inflorescence branching; the branches bearing toward their summits several small rather closely aggregated heads: heads in anthesis 7–8 lines, in fruit 1 inch broad; scales of the involucre appressed, regularly imbricated, narrowly ovate, narrowed above or somewhat abruptly contracted to a short ascending or spreading yellowish spine, and bearing near the apex just beneath the spine a dark glandular (?) streak; the inner bracts longer, narrower, very acute but unarmed, purplish: corollas purple, the narrow throat contracted very gradually into the slender tube; limb not very oblique: filaments hairy: style branches short, not exceeding $\frac{3}{4}$ of a line in length; annulus inconspicuous. — Among shrubs, low lands, Hacienda de Angostura, July, 1891 (n. 3768). Near *C. altissimus*, Willd., which it resembles in its soft, weakly armed leaves of varying form, closely also in its involucre and the color of its flowers, as well as in its tall habit. It differs, however, in its strongly decurrent leaves, smaller, more numerous, and closely aggregated heads, shorter style branches, and less oblique corolla.

Perezia Michoacana. Stem slender, striate-angulate, glabrous, dark purple, 4–6 feet in height, bearing a loosely corymbose, rather few-headed inflorescence: leaves obovate-spatulate, sharply denticulate, rounded at the apex, auriculate-clasping at the base, glabrous, veiny, thickish, and somewhat rigid; the lower ones 6 inches long, half as broad; the upper smaller and more inclined to be acute; those of the inflorescence much reduced, 3–9 lines in length, linear-oblong, acute: heads $\frac{3}{4}$ of an inch high, 40-flowered: scales of the involucre dark purple, fulvous-tomentose on the edges, imbricated in 5–6 ranks and varying greatly in length, the outer being very short, but all acute: corolla purplish: style branches recurved: immature achenes linear, striate, glandular-roughened. — Hills near Patzcuaro, Michoacan, December, 1891 (n. 3988). This spe-

cies stands near *P. rigida*, Gray, but differs from it in its more numerously flowered heads, in the character of the involucre, and somewhat in the shape of the leaves. The heads, however, are not so large as in *P. formosa*, Gray, and *P. turbinata*, Llav. & Lex., nor do the involucral bracts extend down upon the peduncles as in these species.

ANDROSACE (?) CINERASCENS. A spreading perennial of grayish green color, 6–10 inches in height, a little woody at the base: stems ascending, several times branched, very leafy: leaves narrowly linear, acute, sessile, perhaps slightly fleshy, 1–1½ inches long, ½–¾ of a line broad: peduncles slender, smooth, 3–4 inches long, bearing 4–8 corymbosely grouped flowers; pedicels ebracteolate, filiform, 6–8 lines long: the short calyx tube hemispherical; segments lanceolate, acuminate. corolla small, salver-shaped, 2 lines long, white or nearly so: capsule enclosed by the persistent calyx, dehiscent by 5 valves: placenta spherical, raised on a very short stipe: seeds numerous, minute. — Alkaline plains, Hacienda de Angostura, San Luis Potosi, July, 1891 (n. 3765). This plant, which is very different in habit and inflorescence from any Androsace which I know, appears nevertheless to agree with that genus in all essential characters of flowers and fruit. The genus as described by Bentham and Hooker is rather widely drawn. The species just characterized agrees more nearly with § *Aretia* than with *Euandrosace*, but differs from both in its inflorescence.

DICTYANTHUS TUBEROSUS. Root thickish, enlarged and fusiform toward the end, resembling a small tuber: stem short, somewhat woody, erect or procumbent, bearing near its summit several subsimple spreading hirsute branches: leaves ovate, acuminate, entire, deeply cordate, with a narrow but rounded sinus, pubescent on both surfaces and ciliate, 1–1½ inches long, on hirsute petioles 4–7 lines in length: flowers occasionally solitary, usually 2–4 together, with or without a short common peduncle; pedicels 2–4 lines long: calyx divided nearly to the base into lanceolate acuminate hirsute segments, 3–4½ lines in length: corolla campanulate, 4–6 lines deep: tube marked with narrow purple stripes; limb of spreading triangular segments of dark color, and but 2–3 lines in length: follicle narrowly lanceolate in outline, about 2 inches long, tapering to a bluntish apex, armed with short, firm spines, and appearing striate from numerous minute longitudinal folds of its outer integument. — Slopes of barranca near Guadalajara, September, 1890 (n. 3568). First collected by Dr. Edward Palmer near the same locality, July,

1886 (n. 251). Dr. Palmer's specimen was referred by Dr. Gray (P. A. A., XXII. 436) to *D. stapeliæflorus*, since it accorded with Reichenbach's exceedingly defective description. The additional notes and excellent plate of that species in Regel's *Gartenflora*, Vol. VI., however, show clearly that it is altogether different, with larger, somewhat undulate leaves, much shallower corolla tube, and broader differently colored limb. Mr. Pringle's specimen and one of Dr. Palmer's show no tendency toward a climbing habit; but a detached branch with Dr. Palmer's no. 251 has longer, flexuous internodes, suggestive of such a character. The flowers on this branch are larger, and the common peduncles longer.

GONOLOBUS SUBERIFERUS. Stem covered with a thick rough light yellowish corky bark: branches, petioles, and peduncles covered with a spreading pubescence: leaves ovate, acuminate, deeply cordate, with a narrow, often closed sinus, pubescent on both surfaces and ciliate, 1½–2 inches long, 1 inch broad: petioles an inch long: peduncles about half as long, each bearing a single pedicel an inch in length: calyx segments ovate-oblong, acute, pubescent and finely granular on the outer surface, ciliate, nearly smooth within, corolla 1¼ inches in diameter; segments ovate, obtuse, yellowish green, very minutely granular, otherwise smooth, exceeding the calyx by half, not conspicuously marked or veined: top of column white: crown dark brown: follicles slender, smooth, more than 3 inches in length, the calyx persistent at its base. — San José Pass, San Luis Potosi, July, 1890 (n. 3631).

PHACELIA NAMATOSTYLA. A small, slightly fleshy annual: stems numerous, short, 2–3 inches in length, prostrate, branching, pubescent: leaves bipinnatifid, 8–12 lines in length; pinnæ about seven pairs and terminal one, oblong, obtusely lobed, covered above with a fine gray pubescence, smoothish below, except the midrib; margins strongly revolute: racemes numerous, dense, not exceeding the leaves; bracts minute or obsolete; flowers very small: calyx lobes oblong-spatulate, corolla white, a line in length, campanulate with slightly spreading limb of five rounded lobes: stamens inserted upon the lower part of the tube, scarcely equalling the corolla; filaments smooth: style divided nearly to the base; summit of the ovary pubescent; ovules two on each placenta, pendent; capsule globose, shallowly sulcate in the middle of each of the two valves; seeds dark brown, one line in length, conspicuously pitted. — Carneros Pass, Coahuila, May, 1890 (n. 3493). This species is anomalous in its style, which is divided practically to the base, as in

Nama. Its much divided leaves, however, would not go well in that genus.

CORDIA ALBA, R. & S. Mr. Pringle's specimens of this species, collected at Las Palmas, San Luis Potosi (nos. 3676 and 3754) have light yellow flowers as in Wright's 425 from Cuba and Fendler's 921 from Venezuela. No. 3754 has short stamens and considerably longer styles, thus representing the complementary form to that of Ghiesbrecht's 832 and Wright's 425 with exserted stamens and short styles. Darwin * found the difference in the length of the stamens in an undetermined Cordia very slight, the anthers in both forms being "seated in the mouth of the corolla." Here, however, the difference is very noticeable, the stamens of the short-styled form being considerably exserted from the throat, although not exceeding the limb of the corolla.

LITHOSPERMUM CALCICOLA. A cinereous perennial: a foot or more in height, several-stemmed from a branching distinctly ligneous base: stems covered with a spreading hirsute pubescence, subsimple and naked below, branched and very leafy above: leaves elliptic, obtuse, slightly mucronate, sessile, 12–15 lines long, 3–4 lines broad, appressed-pubescent on both sides, white-punctate above; the upper ones similar but somewhat smaller: flowers very small, subsessile: calyx segments lance-linear, densely hirsute, in anthesis scarcely more than a line in length, in fruit 2–3 lines long: corolla very short, scarcely exceeding the calyx: nutlets ovate, more or less conspicuously keeled on the inner surface, usually only one maturing, dark brown, shining, deeply pitted, becoming nearly 2 lines long. —Limestone ledges, San José Pass, San Luis Potosi, July, 1890 (n. 3529). This plant considerably resembles *L. Matamorense*, DC., but differs in its ligneous distinctly perennial base. Its stems are rather more leafy above, the leaves less contracted at the base, and the nutlets slightly larger.

LITHOSPERMUM REVOLUTUM. Perennial: stems one or several arising from a single thickish root, simple or somewhat branched, pubescent, scabrous: lower leaves falling off; the middle and upper stem-leaves thick, oblong or elliptic, entire, revolute on the edges, rounded at the apex, sessile, very scabrous above, pubescent and scarcely paler beneath, 1–2 inches long, 3–7 lines broad: inflorescence rather dense; bracts ovate, ciliate, acute, 4 lines long, not equalling the calyx lobes; flowers short-pedicelled: calyx lobes

* Different Forms of Flowers, pp. 117, 118 (orig. edit.).

linear, nearly equalling the tube of the corolla; the latter apparently yellowish, 4–5 lines in length, with small only slightly spreading limb: style exserted; nutlets small, shining, white or discolored, scarcely keeled. — Alkaline meadows, Hacienda de Angostura, San Luis Potosi, July, 1891 (n. 3802). Distributed as a form of *L. strictum*, Lehm., equalling Schaffner's no. 728. A more careful examination shows that it is not very near Schaffner's doubtful plant, and is certainly distinct from *L. strictum*, which has linear acute leaves, narrow bracts, and keeled nutlets. Mr. Pringle's no. 3245, distributed last year as *L. strictum*, probably also represents a new species. It is much more robust than *L. strictum*, and has a fusiform root more than half an inch in thickness.

IPOMŒA ORNITHOPODA. Glabrous, stem slender, twining, angulate, dark colored: leaves very deeply palmately or rather subpinnately 5–7 parted; lobes linear, 1½–2 inches long, 1–2 lines broad, obtuse, apiculate, entire or wavy; the edges revolute; petioles 6–8 lines long: peduncles springing from most of the axils, but many of them abortive; the developed ones 2–3 inches long, one-flowered; pedicels ½ inch long, somewhat thickened upward: sepals orbicular, thin, 5–6 lines in diameter, rounded or even retuse at the summit, purplish on the margins: tube of the corolla very short, included in the calyx, limb 1½–2 inches in diameter, with a broad open throat, appressed-villous on the outer surface, color uncertain: fruit not seen. — Hills, Canoas, San Luis Potosi, July, 1890 (n. 3553.)

GERARDIA PUNCTATA, Rob. (P. A. A., XXVI. 172). Additional specimens of this plant, collected at Carneros Pass, Coahuila (n. 3682), and Las Canoas, San Luis Potosi (n. 3938), show that it is probably perennial. The corolla sometimes attains a length of 16 lines. The name was unfortunately chosen, since the punctate character of the calyx appears to be exceptional, and perhaps due to the presence of a fungus. Notwithstanding its seemingly perennial nature and longer flowers, this species may prove to be the *G. dasyantha*, Cham. & Schl., insufficiently characterized in Linnæa, V. 104, and DC. Prod., X. 517.

BELOPORONE FRAGILIS. Stem 3–5 feet high, somewhat branched, smooth, scarcely striate, strongly contracted above the nodes and readily disarticulating in a dried state; the transverse lines connecting the bases of the petioles often bearing a tuft of hairs, especially in the younger parts of the plant: leaves ovate, acuminate, blunt at the apex, obtuse or rounded at the base, 1½–3 inches long, nearly half as broad, minutely pubescent above, nearly smooth

below, only the axils of the veins bearing tufts of white hairs: petioles ½–1 inch long: inflorescences axillary, opposite, racemose; bracts few, small, lanceolate; bractlets minute, subulate; calyx glandular-pubescent, of five lance-linear segments, 2 lines long: corolla pubescent on the outer surface, reddish, strongly veined, nearly an inch long; tube narrow; lips subequal, the upper erect, emarginate, the lower spreading, with three very shallow rounded lobes: stamens close to the upper lip, inserted rather low down on the tube; anther cells nearly equal in size, one inserted higher than the other and oblique, both with a small white spur at the base: fruit not seen. — Limestone ledges, Las Canoas, San Luis Potosi, October and December, 1891 (n. 3933).

Habenaria Pringlei. Roots mostly fibrous, but the central one tuberous: stem 3 feet high: leaves sheathing, ensiform, carinate, 6–8 inches long, an inch in breadth, gradually tapering to a long point: bracts lanceolate, sharply acuminate, 2 inches long, 5 lines broad; flowers about 10, large, pedicels 18 lines long; the ovary of equal length: sepals ovate, acuminate, minutely cuspidate, 8–9 lines in length; the upper one erect, scarcely at all galeate; lateral petals 2-cleft to the base, the segments linear, acute, the upper broader, not equalling the sepals; the lower very narrow, more than an inch in length: lip 3-cleft nearly to the base, exceeding an inch in length; the segments all narrow and linear, the lateral somewhat surpassing the thickish, scarcely acute central one: fleshy processes very conspicuous, linear-spatulate, 3–4 lines in length: spur over 5 inches long, exceeding the ovary and pedicel, its tip sheathed in the bracts and apparently adherent to them. — Near Guadalajara, June, 1891 (n. 3823). This striking species is related to *H. macroceratites*, Willd., and *H. setifera*, Lindl., but differs from the former in its much longer narrower leaves, larger flowers, and conspicuous fleshy appendages; from the latter, by its larger more numerous flowers, and in the shape of its petals.

Tigridia pulchella. Bulb small, oval, ½ inch in diameter, with a few fibrous roots at the base: stem slender, flexuous, 6 inches to a foot high, bearing about two narrow linear acute plicate leaves: spathe of two nearly equal lanceolate acute bracts 18 lines long, 5 lines broad: flowers solitary, about an inch in diameter: pedicel slender, an inch in length: ovary 4 lines long: outer segments of the perianth ovate-oblong; the lower part slightly broader, light colored and spotted with purple, the blunt

erose somewhat recurved tips very dark purple, almost black; the inner segments shorter, more narrowed below, and with a broad yellowish minutely granular fold in the middle, the obtuse tips purple but not so dark as the outer ones: staminal column very slender, over 3 lines in length; anthers spreading, about 2 lines long: the six branches of the style with terminal capitellate stigmas. — Collected by Mr. Pringle near Patzcuaro (unnumbered and not distributed). The description of this attractive little species has been drawn from specimens cultivated and kindly communicated by Mr. Edward Gillett, of Southwick, Massachusetts.

TRADESCANTIA ANGUSTIFOLIA. A very slender grass-like species, 6 inches in height: roots of numerous delicate fibres: stems slender, glabrous, somewhat decumbent: leaves narrow, linear, very acute, 1–2 inches long, a line or less in breadth, glabrous except the ciliate margins of the sheaths: flowers small, about 3 lines in diameter, some solitary, but for the most part umbellately grouped at the ends of terminal peduncles (1–2 inches in length): the subtending bracts much shorter than the pedicels: sepals ovate, acute: petals roseate: stamens very different, the longer ones with smooth bent filaments, the broadly dilated somewhat horseshoe-shaped connective bearing the small orange-colored anther cells in a transverse position; in the shorter stamens the anthers larger, pinkish, the connective much less developed, and the cells parallel or nearly so: seeds triangular, brown, and somewhat radially rugose. — Thin soil of limestone ledges, Las Canoas, San Luis Potosi, August, 1891 (n. 3902).

CONTRIBUTIONS FROM THE GRAY HERBARIUM
OF HARVARD UNIVERSITY.

NEW SERIES, No. III.

ADDITIONS

TO THE

PHÆNOGAMIC FLORA OF MEXICO,

DISCOVERED BY C. G. PRINGLE IN 1891-92.

BY B. L. ROBINSON AND H. E. SEATON.

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Mo. Bot. Garden,

VII.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY, NEW SERIES.

III.* — ADDITIONS TO THE PHÆNOGAMIC FLORA OF MEXICO, DISCOVERED BY C. G. PRINGLE IN 1891–92.

By B. L. Robinson and H. E. Seaton.

Presented January 11, 1893.

Thalictrum tomentellum. Polygamo-dicœcious: stem striate, fistulous, finely and densely pubescent: leaves tripinnate: petioles 1–2 inches long, tomentulose as well as the rachis and petiolules: leaflets suborbicular, subcordate, finely pubescent above, paler and tomentulose below, shallowly 3-lobed; lobes rounded, entire or with 2–3 rounded teeth: inflorescence pyramidal, subnaked: sepals 4–5, ovate-elliptical, 2 lines long: stamens spreading; anthers with rather long setiform tips: fruiting heads nodding on the pedicels; carpels about 10, scarcely stipitate, lanate, rugose-reticulate, hispidulous, very acuminate, and tipped with a very long filiform finally deciduous style. — Low lands about Lake Patzcuaro, Michoacán, July, 1892 (n. 4143). Differing markedly in its fine soft pubescence from various allied species.

Polygala Michoacana. Perennial, glabrous: stems several, slender, erect, approximate, angulate, simple, or with a few long slender erect branches: leaves small, lance-linear, scarcely spreading, sessile, very sharply acuminate, 2–4 lines in length, not exceeding ½ line in breadth: spikes terminal, 1–2 inches long: bracts caducous, awl-shaped, very acute, purple, ¾ line long: flowers small, short-pedicelled, nodding, deflexed in fruit: sepals narrow, appearing very acuminate through the infolding of the margins, greenish white with purple midribs, the three smaller acute, the alæ pointed but obtuse,

* The two papers published by B. L. Robinson in these Proceedings, Vol. XXVI. pp. 164–176, and Vol. XXVII. pp. 165–185, are regarded as Nos. I. and II. of this series.

1½ lines long, but ½ line broad: petals white, not equalling the alæ: capsule orbicular, retuse, slightly margined. — Amongst pines, hills of Patzcuaro, Michoacan, August, 1892 (n. 4151). A species much resembling *P. scoparia*, HBK., but differing in its narrower and more pointed sepals, and in its orbicular not at all oblong fruit.

ABUTILON ATTENUATUM. Branches slender, terete, woody, stellate-pubescent: leaves lanceolate, attenuate, serrate, shallowly cordate, 2–2½ inches long, 10–12 lines broad, 3-nerved from the base, green and finely pubescent with simple hairs above, somewhat paler and soft pubescent with stellate hairs beneath: petioles 2–4 lines long: flowers in open terminal subsimple racemes: pedicels spreading, 7–9 lines in length: calyx lobes pubescent, ovate, acuminate, 3 lines long: corolla orange-yellow, once and a half as long as the calyx: capsule hirsute with spreading setaceous tips. — Slopes of mountains near Lake Chapala, Jalisco, November, 1892 (n. 4354).

PAVONIA MELANOMMATA. Two feet or more in height, finely glandular-pubescent: leaves ovate, acuminate, attenuate, crenate, soft pubescent above, velvety and cinereous beneath, 3–4 inches long, half as broad, the radical considerably smaller; petioles an inch long: pedicels ¾–1½ inches long: involucre of 5 linear bracts distinctly exceeding the calyx; the latter stellate-pubescent throughout: corolla externally pubescent, 1¼ inches in diameter, 3–4 times as long as the calyx, purplish white with an almost black glabrous centre; staminal column bearing near the base a number of short dark spatulate appendages (rudimentary stamens?): carpels glabrous, at maturity with sharp lateral angles, slightly keeled dorsally. — Volcanic hills, Monte Leon, Michoacan, November, 1892 (n. 4343). Possessing much the habit of *P. hirtiflora*, Benth., but having ovate crenate leaves, corolla smooth at the base within, and staminal appendages.

ASTRAGALUS TOLUCANUS. Root stout: stems several, slender, ascending, knotted below, minutely appressed-pubescent: stipules lanceolate, ciliate, acute, 2½–4 lines long: leaves 1½–2 inches long; leaflets 9–12 pairs, petiolulate, oblong, truncate or retuse, 2½–3½ lines long, glabrous above, appressed-pubescent below especially upon the midrib and near the margin: peduncles not exceeding the leaves: racemes dense, 1–2 or more inches in length: bracts oblanceolate to obovate, acute, pubescent, 2–3 lines long, persistent: pedicels a line in length: calyx light colored but covered with short black hairs; the teeth narrowly lanceolate, attenuate, 1¾ lines long, equalling the tube, densely black hairy: standard obovate, retuse, 5–6 lines long, it and alæ blue (in a dried state) and conspicuously striate with white: keel much

shorter and with a violet tip: pod oblong, smooth, 4 lines in length. — On drier ridges under pines, Nevado de Toluca, 12,000 ft., September, 1892 (n. 4238). Near *A. Mandoni*, Rusby ined., of Bolivia, represented by Bang's no. 1022, but differing in its more slender stems, smaller leaflets, and broader bracts.

STYLOSANTHES DISSITIFLORA. Much branched from near the base, 8–10 inches high, copiously beset with soft brownish setose hairs: sheath of the stipules 1½ lines long, equalling the subulate setiform appendages: free portion of the petiole 1–1½ lines long: leaflets linear lanceolate, sharply acuminate, somewhat narrowed but obtusish at the base, glabrous on both surfaces, strongly ciliate, 4–6 lines long, ¾–1¼ lines broad, veins prominent beneath: flowers scattered, pinkish: stipe of the calyx 1⅔ lines long, divisions of the limb obtuse, ciliate: standard obovate-orbicular, retuse, 3 lines in length: alæ obovate with very slender auricles: fruit not seen. — Dry rocky soil, Rio Blanco near Guadalajara, September, 1891 (n. 5172).

COTYLEDON SUBRIGIDA. Glabrous, 1½–2 feet in height: leaves radical, sessile, ovate, acute, 3–4 inches long, two thirds as broad: stem and branches covered with a light bluish bloom: bracts of the stem 5–10 lines long, of the branches minute: inflorescence about a foot long, with about 8 spreading somewhat rigid racemosely 5–7-flowered branches: flowers large (⅔ inch), approximate, borne on the upper side of the branches: pedicels a line or two in length: sepals lanceolate-acuminate, half the length of the petals; the latter lanceolate-acuminate, acutely keeled, somewhat gibbous at the base, red, internally tinged with yellow: stamens nearly equalling the corolla. — Ledges and cliffs, Tultenango Cañon, State of Mexico, October, 1892 (n. 4326). Near *C. gibbiflora*, Moç. & Sess., but with the branches of the inflorescence shorter and more rigid, leaves shorter, etc.

SEDUM PRINGLEI, Wats. var. ? MINUS. An inch or less in height: inflorescence more dense: antheriferous stamens only 5. — Bare earth, summit of the Nevado de Toluca, September, 1892 (n. 4240). Perhaps distinct: also near Peyritsch's *S. napiferum*, but differing in stamens, etc.

CUPHEA (DIPLOPTYCHIA) AVIGERA. A slender annual a foot and a half high: stem slightly scabrous, the middle of each internode glutinous: leaves opposite, membranaceous, nearly sessile, narrowly lanceolate, 1½–2½ inches long, tapering almost from the subcordate base to the acuminate tip, roughened by minute hairs and somewhat adhesive: racemes axillary, alternate, loosely 3–5-flowered: bracts linear, much longer than the pedicels: bractlets none: calyx glandular-

hirsute, 4–5 lines in length, appearing horizontal, the ascending acutish spur being more than half as long as the proper tube, the latter narrowed upwards: the petals lilac, elliptical, subequal: the dorsal 2 lines, the four ventral 1½ lines long: stamens 11, included: ovules 6.— Moist banks, mountains near Lake Chapala, Jalisco, November, 1892 (n. 4349). A species well marked by the almost horizontal calyx, which in shape resembles the body of a bird.

CUPHEA (LEPTOCALYX) REIPUBLICÆ. Slender, decumbent, about 3 feet high, somewhat branched: stem slightly scabrous with minute transverse hairs attached in the middle and with a line of much longer hairs: leaves ovate, acuminate, hispid on both surfaces, paler beneath, 1–1½ inches long, two thirds as broad, abruptly narrowed at the base into a petiole 3–5 lines in length: pedicels interpetiolar, 3 lines long: calyx slender, nearly straight, almost an inch in length: the tube red with a white spot on the ventral surface at the summit, hispidulous, shortly and obtusely spurred: appendages linear oblong, setulose, green, considerably exceeding the lobes: petals deciduous, bright yellow, all small, the 2 dorsal 1¾ lines long, the 4 ventral about a line in length: stamens 9, unequally exserted: ovules about 12. — Rocky hills near Patzcuaro, Michoacan, October, 1892 (n. 4112). An attractive species, somewhat resembling the commonly cultivated *C. platycentra*, the calyx bearing the colors, red, white, and green, of the Mexican flag.

FUCHSIA PRINGLEI. Shrub, 2 feet high, with a brown shreddy bark: branches purple, pulverulent: leaves small, ovate-elliptic or lance-elliptic, obtuse, narrowed to a short petiole, somewhat undulate and revolute on the margins, very minutely pubescent above, considerably paler and nearly smooth beneath, about 4 lines long, half as broad: flowers 3 lines long, short peduncled, axillary, solitary: peduncles slender, 2 lines in length: calyx segments dark purple, oblong, apiculate, reflexed, two thirds as long as the free part of the tube: petals obovate, spreading, undulate, about equalling the segments of the calyx: stamens slightly exserted; style considerably so: fruit globose, 3–4 lines in diameter, black. — Mountains near Patzcuaro, Michoacan, November, 1891, in fruit (n. 5063); barranca near Guadalajara, Jalisco, September, 1891, also in fruit (n. 5002); and under pines, mountains near Patzcuaro, Michoacan, July, 1892 (n. 4140). This species differs from *F. minutiflora* and *F. mixta*, Hemsl., in its reflexed calyx segments, its undulate not serrulate leaves, and its relatively longer petals.

CYCLANTHERA PRINGLEI. Stem slender, nearly smooth, 5-ribbed:

leaves thin, ovate, undivided or more or less hastately 3-lobed, callous-denticulate, punctate on both surfaces, glabrous below, minutely pubescent on the nerves and somewhat scabrous above, 1–2 inches in length, acuminate and mucronate at the apex, deeply cordate at the base with a rounded open biglandular sinus: glands stipitate, minute, $\frac{1}{4}$–$\frac{1}{3}$ line in diameter, on pedicels of equal length: tendrils slender, simple: racemes 4–5 lines long: staminate flowers yellow, $\frac{2}{3}$ line broad: rather single, annular, horizontal: fruit $\frac{1}{2}$ inch long, 4 lines broad, very oblique and strongly curved, laterally compressed, acutely beaked, armed with a few short weak spines; the convex suture spirally revolute in dehiscence. — Rocky hills near Patzcuaro, Michoacan, October, 1892 (n. 4317). Near *C. biglandulifera*, Cogn. (ex char.), but with more simple tendrils and very much smaller glands.

Piqueria laxiflora. A sparingly pubescent annual, $1\frac{1}{2}$ feet high: stem weak, furrowed, branching: leaves thin, lanceolate, narrowed to an obtuse point, serrate, 3-nerved, $1\frac{1}{2}$–2 inches long: petioles 3 lines in length: branches slender, terminating in loose panicles with flexuous filiform divisions: bracts minute, linear, 1–$1\frac{1}{2}$ lines long: pedicels filiform, spreading, 3–6 lines in length: heads 4-flowered: scales of the involucre 4 (2 narrower), thin, green, slightly fringed above and mucronate: achenes black, 5-angled, 1 line long, narrowed downward. — Cool slopes and ledges, Cañons of mountains near Lake Chapala, Jalisco, November, 1892 (n. 4333). Well characterized by its very diffuse inflorescence, which suggests *Valeriana sorbifolia* and allies.

Piqueria Pringlei. Rhizome horizontal, branching, several inches in length: stems subsimple, slender, erect, purplish, 1–$1\frac{1}{2}$ feet high, with a fine grayish pubescence: leaves broadly ovate, an inch in length, serrate, rather abrupt at the base, pubescent: petioles 3–4 lines long: inflorescence a rather dense irregular corymb: heads 2 lines long, 4-flowered: scales of the involucre 4, obovate, lacerate above and mucronate at the apex: corolla $1\frac{1}{2}$ lines long: filaments pubescent: achenes glabrous, black, a line in length. — In pine woods, Nevado de Toluca, September, 1892 (n. 4285). Habit of *P. pilosa*, HBK., but differing in its well developed rhizome, in its leaves more abrupt at the base, and its pubescent filaments.

Stevia laxa. — Root of numerous strong fibres: stem erect from a slightly decumbent base, about 2 feet high, purplish, terete, puberulent, substriate, simple up to the lax finely glandular inflorescence: leaves rather numerous below, opposite, ovate, acutish, crenate-serrate, 1–$1\frac{1}{2}$ inches long, nearly smooth, paler beneath, contracted below into

petioles of almost equal length: heads rather few, very loosely disposed upon slender subdichotomous branches: scales of the involucre lance-linear, acuminate, a little over 2 lines in length, covered with fine dark glandular pubescence: corollas white, externally roughened and with a pubescent limb; tube exserted: achenes slightly roughened, $1\frac{1}{4}$ lines long; pappus lacerate coroniform; aristæ none.— Dry hills near Patzcuaro, Michoacan, November, 1891 (n. 5051). The same as Bourgeau's no. 3331, from Escamella, near Orizaba, October, 1865.

Eupatorium Saltivarii, Schultz Bipontinus. Rootstock horizontal, branching: stems several, erect, purple, pubescent, glandular above, 1–2 feet high, throwing out several small weak branches near the base: leaves ovate, acute, coarsely serrate, abrupt at the base. pubescent on both surfaces, 1–$1\frac{1}{2}$ inches long, more than half as broad: petioles 3–4 lines in length: heads rather few, aggregated in small terminal corymbs, 4 lines high, about 50-flowered: involucral scales subequal in about two series, lanceolate, acute, ciliate, striate, the outer glandular: corolla tubes slender, as long as the ample throat: achenes slender, slightly curved, $1\frac{1}{3}$ lines in length, hispidulous, callous-tipped at the base. This apparently good species of Schultz Bipontinus, founded upon Schaffner's no. 298 from the Val de Mexico, October, 1855, seems never to have been described. It has since been collected by Bourgeau in the same place (n. 818), and by Mr. Pringle in pine woods, Nevado de Toluca, State of Mexico, September, 1892 (n. 4286).

Brickellia squarrosa. Stems subsimple, 2 feet or more in height, terete, covered with short dense pubescence, somewhat glandular roughened above. leaves opposite, oblong-lanceolate, obtusish, more or less acute at the base, crenate, $1\frac{1}{4}$–2 inches in length, very rough and somewhat rugose above, prominently reticulated, hispid on the veins and black punctate on the surface below: petioles 4 lines long: heads 7 lines long, about 12-flowered, in a subsimple raceme: pedicels an inch long: the outer scales of the involucre shorter, herbaceous, squarrose, glandular; the inner thin, purplish-striate, acute: corolla lobes minutely callous-tipped: achenes pubescent: pappus appressed-barbellate. — Mountains near Patzcuaro, Michoacan, December, 1891 (n. 5054).

Sabazia subnuda. Root of many fibres from a short rootstock: stems slender, erect, pubescent, almost naked, bearing one to three large long-peduncled heads: radical leaves ovate-elliptical, obtuse, entire, triply nerved, narrowed to a short broad petiole, ciliate, glabrous

above, paler and subglabrous below, 1¼–2 inches long; the cauline usually a single pair, reduced to short linear bracts: heads including rays 1¼ inches broad: outer bracts of the involucre ovate, commonly purplish, obtusish, 4 lines in length, the inner somewhat longer, narrower and ciliolate: rays purplish white, oblong, conspicuously 3-toothed, exceeding half an inch in length, abruptly contracted below into a very slender tube: receptacle elongated: chaff filiform: achenes black, glabrous. — In pine forests, Nevado de Toluca, 12,000 ft., September, 1892 (n. 4226).

VERBESINA ONCOPHORA. Shrub: younger parts gray-tomentulose: leaves lance-elliptic, acuminate in each direction, thickish, 3–7 inches long, finely and rather regularly serrate, scabrous above, tomentose and pulverulent beneath with yellowish white hairs; petioles ⅓–½ inch long; a small fleshy folded finally deciduous appendage occurring on each side of the base: corymbs compound, many headed: heads 4 lines in diameter: scales of the involucre acute, not at all foliaceous: rays yellow, about 8, exserted 2–3 lines: disk flowers pubescent: achenes rather narrowly winged, 1⅓ lines long, hispidulous upon the faces. — Sierra de las Cruces, State of Mexico, October, 1892 (n. 4310); Bourgeau's 967, Forest of San Nicolas, near Mexico, 1865–66. Near *V. persicifolia*, DC., but differing in the greater pubescence and finer serration of the leaves, the presence of the peculiar excrescences on the stem at the base of the petioles, and in the pubescent corollas.

TRIDAX PALMERI, Gray, var. INDIVISA. Rough pubescent, almost hirsute: leaves ovate, rather irregularly dentate, scabrous, undivided. — Cañon ledges, mountains near Lake Chapala, Jalisco, November, 1892 (n. 4332). This plant corresponds except in its pubescence to Parry & Palmer's 489. But both of these specimens differ so conspicuously from the form of the species with divided leaves, represented by Parry & Palmer's 482½ and 490, and Schaffner's 236, that it seems best to characterize them as a variety. Parry & Palmer's 489 corresponds rather closely with this variety in its foliage, but is much less pubescent, and in this regard furnishes a transition to the smoother forms with undivided leaves, represented by the other type specimens (Parry & Palmer's 482½ and 496) and by Schaffner's 236.

SCHKUHRIA GLOMERATA. Roots fibrous: stem simple, erect, striate, glandular-hirsute, 1½ feet high: the lower leaves opposite, petiolate, minutely resinous-dotted, palmately 3-parted to the base; segments linear or linear-oblong, the middle one sometimes toothed, the lateral ones very deeply bifid: the upper leaves alternate, sessile, simplified: heads aggregated at the ends of the branches: pedicels

short: involucre commonly campanulate rather than turbinate, 2 lines long; bracts about 8, oblanceolate, pubescent, purplish, scarious-margined: rays none: disk flowers white, 10–12: achenes sharply 4-angled, very pubescent: pappus scales 8, suborbicular, narrowed and thickened toward the base. — Rio Hondo, State of Mexico, September, 1891 (n. 5006), and from the same locality, September, 1892 (n. 4289). Well characterized by its short-pedicelled, somewhat aggregated heads, and subcampanulate involucres.

Senecio alienus. Nearly smooth below, minutely glandular above: stem herbaceous, purplish, somewhat striate, with flexuous character suggestive of a climbing habit: leaves long-petioled, shallowly 3-lobed, broadly triangular in outline, or by the development of two obtuse angles near the base irregularly pentagonal, finely cuspidate-dentate, nearly smooth, light colored sometimes purplish beneath, 2½–4 inches in diameter, peltately attached near the subcordate base; lobes acute: inflorescence lax, irregularly racemose-paniculate: bracts filiform: the heads developing successively the highest first, 12–15-flowered: buds ovate: involucral bracts purplish, hispidulous and glandular, about 8 in number, linear lanceolate with incurved acute tips: corolla of Eusenecio: anthers sagittate: achenes glabrous, 10-ribbed. — Mountains near Patzcuaro, Michoacan, December, 1891 (n. 5056). In its peculiar inflorescence and successive development of the heads, as well as in its sagittate anthers, this species approaches the East Indian section Synotis.

Senecio Jaliscana, Wats. (Proc. Am. Acad., XXVI. 143). Mr. Pringle's later specimens of this species add the following characters. Height 8–10 feet: lower leaves rather deeply cordate, shallowly lobed, 8 inches long, nearly as broad. — Cool wooded cañons, mountains near Lake Chapala, State of Mexico, November, 1892 (n. 4329).

Cacalia platylepis. Root a cluster of strong fibres: stem herbaceous, woolly at the base, otherwise smooth, sulcate-striate: radical leaves long-petioled, ovate, cordate; limb coriaceous, smooth, strongly reticulated, pinnately divided, 10–12 inches long, two thirds as broad; segments irregularly 2–3-parted, the margins callous-denticulate: the cauline leaves much reduced, the upper consisting almost entirely of broad ovate sheathing petioles, toothed near the apex: heads corymbose, very large, 40–50-flowered, subtended by several laciniately toothed bracts: involucre broadly campanulate; the scales strongly imbricated in two series, ovate, thickened in the middle, acutish, the margins ciliolate, the tip bearing a tuft of hairs: corolla very slender, 6–7 lines long, the tube somewhat exceeding the limb: achenes

(immature) 1½–2 lines long, pubescent. — Collected by Dr. Edward Palmer on the Rio Blanco, Jalisco, October, 1886 (n. 689), and by Mr. Pringle on the plains of Guadalajara, November, 1888 (n. 1816). Both of these plants have been referred through some oversight to *C. raduliæfolia*, HBK., by Drs. Gray and Watson (Proc. Am. Acad., XXII. 433), and distributed under this name. They must, however, be very distinct from that species, which has, according to the description, numerous small 5-flowered heads. *C. platylepis* evidently stands close to *C. cervariæfolius*, DC., but is amply distinct in foliage and size of the heads.

CACALIA PELTIGERA. Roots several, short, thick and tuberous: stem herbaceous, about 3 feet high, terete, purple, nearly smooth: leaves mostly radical, long-petioled, centrally peltate, orbicular in outline, 8–12 inches in diameter, pubescent on both surfaces, especially upon the veins, deeply 9–11-parted with rounded sinuses; the lobes narrow, 2–3-parted; the divisions attenuate, sharply and irregularly toothed; the cauline leaves similar but smaller: heads small, 5–7-flowered, in a naked much branched corymb: bracts of the involucre about 5, oblong or oblanceolate, obtusish, 3 lines in length, with narrow scarious margins, and usually bearing at the tip a tuft of very short hairs: corolla 5 lines in length; the lobes exceeding the tube: achenes conspicuously striate-sulcate, nearly smooth, 2½ lines long. — First collected by Dr. Edward Palmer on the Rio Blanco, Jalisco, in 1886 (n. 171); then by Mr. Pringle on bluffs of a barranca near Guadalajara, September, 1891 (n. 5154). The former specimen was referred by Dr. Watson (Proc. Am. Acad., XXII. 432) to *C. Schaffneri*, Gray, from which, however, it differs essentially in its short thick roots, centrally peltate leaves with much more attenuate segments, and in its nearly smooth achenes.

CNICUS TOLUCANUS. Radical leaves lance-oblong, acute, about 25-lobed, green and strigose-pubescent above, much paler and somewhat arachnoid beneath, 7–10 inches long, 1½–2 inches broad; lobes ovate-oblong, acute, spinulose-dentate, gradually diminished downward: the cauline leaves much reduced, not decurrent: heads nodding, usually solitary at the ends of long slender nearly naked branches, 1½–2 inches in diameter: outer bracts of the involucre short, narrowly lanceolate, spinulose-dentate, with slender reflexed tips; the inner much longer, with dilated purple fimbriate unarmed tips: corollas purplish, 8 lines in length, glabrous: filaments puberulent; tails of the anthers lacerate-toothed: achenes compressed, black, smooth and shining, 2 lines in length. — Wooded cañons, Sierra de las Cruces, State of Mexico August, 1892 (n. 4308).

PEREZIA HEBECLADA, Gray (Pl. Wright. I. 127). This rare species has been rediscovered by Mr. Pringle, and his excellent specimens show the following additional characters. Leaves coriaceous, crowded, strongly reticulate, oblong, sagittate-cordate, abruptly pointed, 4 inches or more in length, nearly half as wide; the upper gradually diminishing in size, acuminate. — Pedrigal, Valley of Mexico, Federal District, December, 1892 (n. 4360).

PEREZIA VERNONIOIDES, Gray (Proc. Am. Acad., XXII. 433), founded upon Palmer's no. 745 from Jalisco, proves to be a form of *Vernonia serratuloides*, HBK.

LOBELIA PICTA. Glabrous, 6–8 inches in height: stems slender, decumbent, rooting from the lower joints, simple or with one or two branches from near the base, leafy, minutely angulate through the decurrent margins of the leaves: leaves linear, sessile, narrowed to an obtusish point, inconspicuously appressed-serrulate, 1-veined, thickish, 1 inch in length, ½ line in width; a few of the lowest leaves of a very different form, broadly spatulate, obtuse, 3–4 lines long, narrowed to a very slender petiole 6–8 lines in length: inflorescence spicate-racemose, raised on a naked peduncle an inch or more in length: bracts linear, 1–2 lines long, the lower equalling, the upper exceeding the pedicels: flowers nodding, ½ inch in length: calyx tube symmetrical, becoming in fruit almost hemispherical, exceeded by the linear acute serrulate teeth: corolla tube not equalling the calyx teeth, lobes lanceolate or ovate-lanceolate, acute, 3 lines in length, light blue or white, conspicuously pencilled with dark blue: filaments short, pubescent: anthers hispidulous, the two lower slightly smaller, tufted at the apex, the other three with minute setæ. — Cold springy meadows, Sierra de las Cruces, October, 1892 (n. 4305). A very attractive species with small but beautifully variegated flowers; to be distinguished from *L. Orizabæ*, Mart. & Gal., and *L. paucifiora*, HBK., by its very short corolla tube, by the hispidulous anthers, etc.; from *L. Irasuensis*, Plan. & Oerst., by the symmetrical calyx not acute at the base.

ARCTOSTAPHYLOS RUPESTRIS. A shrub 4–10 feet high with brown shreddy bark: leaves 4–5 inches long, coriaceous, oblong-elliptic, acute at both ends, finely serrate with cartilaginous teeth, when young erect, pubescent above, densely ferruginous-tomentose on the under surface, with age reflexed, glabrate above, and becoming less tomentose and tawny beneath, not however glabrate: racemes of the panicle rather loosely flowered, scarcely at all secund, covered with a fine grayish pubescence; bracts crimson, lanceolate, 3 lines long,

slightly surpassed by the straight spreading pedicels: corolla white, globose; filaments hairy at the base: fruit not seen. — Dry rocky hills near Patzcuaro, Michoacan, October, 1892 (n. 4318). Resembling *A. arguta*, Zucc., in the form and indentation of the leaves, but differing in their pubescence and in the inflorescence. Also near *A. attenuata*, Hemsl. (ex char.), but not glandular, and with acute by no means rounded leaves.

GENTIANA WRIGHTII, Gray. Mr. Pringle's no. 4237, from moist meadows, Nevado de Toluca, 11,000 ft., State of Mexico, September, 1892, is apparently a low and considerably branched form of this species, 4–6 inches in height; while no. 4196, from wet meadows, valley of Toluca, is another form nearer the type.

HALENIA CRASSIUSCULA. Biennial, glabrous, slightly fleshy, 2–4 inches in height: stem erect, very narrowly 4-winged, much branched: radical leaves oblanceolate, 3-nerved, petiolate, obtuse, including petioles an inch in length: cauline leaves 1–3 pairs, narrowly oblanceolate or oblong, obtuse, narrowed at the base: flowers including spur 6 lines long, densely aggregated at the ends of the stems and branches: calyx segments linear-oblong, obtuse, about half the length of the white corolla; spurs slender, spreading, and curved upwards; flowers after anthesis slightly nodding, not at all resupinate: capsules exserted, acute, 4 lines in length. — Bare alpine summits, Nevado de Toluca, 14,000 ft., September, 1892 (n. 4229).

HALENIA PRINGLEI. Glabrous: root biennial: stem single, simple or nearly so, slender, erect, a span high: radical leaves narrowly oblanceolate, 1-nerved, attenuate below to a slender petiole; the cauline 1–2 pairs, short, lance-linear: umbellate cymes usually 3; the lateral from near the middle of the stem, about 3-flowered, the terminal about 5-flowered: pedicels 3 lines in length: sepals oblong, acute, half the length of the corolla: corolla white, 4 lines long; spur slender, deflexed spreading and curved ascending, about equalling the corolla: capsule exserted, acutish. — Springy meadows, Sierra de las Cruces, State of Mexico, August, 1892 (n. 4209).

KRYNITZKIA LINIFOLIA, Gray. Mr. Pringle's no. 4241, from muddy hollows of prairies, Flor de Maria, September, 1892, closely approaches this species, and has been provisionally referred to it. It belongs to the imperfectly known group of South American Krynitzkias with procumbent subfleshy stems and linear opposite somewhat connate leaves.

RUSSELIA SUBCORIACEA. Glabrous: stems somewhat ligneous, branched, 4-angled: leaves opposite, very short petioled, ovate, acu-

minate, 2½ inches long, 1½–1¾ inches broad, subcoriaceous, slightly glossy above, a little paler and with prominent veins beneath, the edges crisp: flowers on short opposite branches; pedicels about 3 lines long, calyx teeth acuminate; corolla ¾ inch long, three times the length of the calyx, bright red; tube cylindrical, densely yellow bearded in the throat; lobes 4, the three ventral subequal, the dorsal broader emarginate; filaments bearded below; the rudiment one third to one half the length of the others: capsule ovate, 4 lines long, the acuminate valves at last bifid: seeds separated by hairs. — Tamasopo Cañon, San Luis Potosi, June, 1891 (n. 5086). This is an anomalous species, sharing almost equally the characters of Pentstemon and Russelia. However, its angled stem, short rudimentary stamen, cylindrical corolla tube, and the capillary structures between the seeds, show apparently a stronger affinity to the latter genus.

CASTILLEIA PALLIDA, Kunth. var.? ANGUSTATA. A span high: leaves simple, linear: floral bracts lance-linear, acute: flowers pale yellow. — Grassy slopes near Patzcuaro, Michoacan, July, 1892 (n. 4117).

PEDICULARIS EBURNATA. Rhizome short, knotty: stem erect, hirsute-pubescent, terete, simple, 2–3 feet in height: leaves in outline lance-oblong, acuminate, 5–6 inches long; rachis pubescent; leaflets 16–22 pairs, ovate or lanceolate, acute, cleft into about 7 lobes, green and scarcely pubescent below; the segments margined with white ivory-like teeth; petioles of the radical leaves 2–3 inches long, pubescent; of the upper cauline leaves short or none: spike simple, more than a foot in length; bracts lance-linear, callous-denticulate with reflexed teeth, acuminate, the lowest surpassing and the others equalling the calyx: calyx 3–4 lines high, ovate, pubescent; teeth subequal, ciliate or slightly denticulate: galea narrow at the base, enlarged upwards, truncate at apex, considerably exceeding the lip, the latter 4 lines in length, with 3 orbicular crenate lobes; the middle one slightly smaller than the lateral: capsule smooth, ovate, 2-edged, shortly acuminate, 5 lines long. — Sierra Madre, 9,000 feet, Chihuahua, October, 1887 (n. 1556).

DICLIPTERA RESUPINATA, Juss. var. ORBICULARIS. Leaves large, ovate, 1½–2½ inches long: lateral pedicels very short: involucral bracts larger, thinner, and more deeply cordate than in the typical form, distinctly orbicular, retuse. — Barranca near Guadalajara, October, 1891 (n. 5169).

SALVIA CLINOPODIOIDES, HBK. Specimens corresponding accurately to Kunth's description and plate of this noteworthy species have

been found in sandy fields, hills of Patzcuaro, Michoacan, October, 1892 (n. 4258). They show that the plant is 1½ feet or more in height, and that the roots bear fusiform tubers an inch or two in length.

SPIRANTHES AURANTIACA, Benth. & Hook. var. ACUMINATA. Bracts narrower, acuminate, somewhat exceeding the flowers, the edges involute. Collected by Dr. Palmer in Jalisco, 1886, no. 581, and by Mr. Pringle on foothills of the Sierra Madre, Chihuahua, 1887 (n. 1509), and again on swells of low meadows, Valley of Toluca, September, 1892 (n. 4280).

DIOSCOREA MINIMA. Glabrous (♂ only seen): tuber globose, ⅓–⅔ inch in diameter: stem weak, flexuous, 1–3 inches high, about 2-leaved: leaves ovate, cordate, acuminate, about 9-nerved, 1 inch or less in length, on petioles 3–6 lines long: staminate spikes 2–4, slender, pedunculate or subsessile, less than an inch in length, rather densely flowered, not manifestly verticillate except below: bractlets linear, two thirds as long as the flowers: divisions of the perianth elliptical, obtuse, 1¼ lines in length, white with a green midvein; stamens 3, a third shorter than the perianth. — Lava beds near Patzcuaro, Michoacan, July, 1892 (n. 4157). This species is nearly related to *D. multinervis*, Benth., but differs in the form of the leaves and in the length and color as well as somewhat in the arrangement of the flowers.

In the labels of Mr. Pringle's distribution of 1893 the following corrections are to be noted: —

4119, *Piqueria Pringlei*, Rob. & Sea.
4133, drop mark of interrogation.
4229, read *crassiuscula*, not *crassicula*.
4238, *Astragalus Tolucanus*, Rob. & Sea. n. sp.
4246, *Senecio procumbens*, HBK.
4296, add *ex char.*

Arb.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

NEW SERIES, No. IV.

NEW AND LITTLE KNOWN PLANTS

COLLECTED ON MOUNT ORIZABA IN THE SUMMER OF 1891.

BY HENRY E. SEATON.

FROM THE PROCEEDINGS OF THE AMERICAN ACADEMY OF ARTS AND SCIENCES,

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VIII.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY, NEW SERIES.

IV. NEW AND LITTLE KNOWN PLANTS COLLECTED ON MT. ORIZABA IN THE SUMMER OF 1891.

By Henry E. Seaton.

Presented by B. L. Robinson, January 11, 1893.

The descriptions of new species and notes upon a few other plants of interest presented in this paper are based upon a collection made by the author on Mt. Orizaba in July and August, 1891. Mt. Orizaba in the State of Vera Cruz has been visited by a number of collectors, and is among the best known regions in Mexico. This is especially true of its lower slopes in the vicinity of the towns of Cordoba and Orizaba. These regions, where the writer's first collections were also made, are on the southeastern slope of the mountain at altitudes of 2,700 and 4,000 feet. Higher points were successively visited, until the station of Esperanza was reached, on the southern slope of the mountain and at an altitude of 8,000 feet. In this region seven of the new species here described were discovered. The ascent of the peak to an altitude of 14,000 feet was made on the western slope above the town of Chalchicomula. The remaining new species were found between 9,000 and 12,000 feet.

Drs. J. M. Coulter and J. N. Rose have been so obliging as to determine some of the Umbelliferæ, and their descriptions of two new species are herewith given. The notes upon the Grasses are kindly furnished by Prof. F. Lamson-Scribner. Warmest thanks are also due Dr. B. L. Robinson, for his ready assistance in many of the determinations.

Ranunculus geoides, HBK. Pine woods, Mt. Orizaba, 11,000 ft., August (no. 179). This species has been somewhat confused with *R. Hookeri*, Schl., but is distinguished by its more simple habit, smaller and merely 3-lobed or parted radical leaves, and slightly narrower petals.

THELYPODIUM LONGIFOLIUM, Wats. Rich ravines, Mt. Orizaba, 10,000 ft., August (no. 250). The radical leaves are not present in the type of this species, and later specimens in the Gray Herbarium also lack them. The Mt. Orizaba specimens show them to be about an inch long, narrowly spatulate, obtuse, sparingly toothed at the apex, and very hispid with stellately branched hairs.

CERASTIUM ORITHALES, Schl. (Linnæa, XII. 209). Pine woods, Mt. Orizaba, 13,000 ft., August (no. 236). A very handsome species, well characterized by its simple stem and large flowers.

CERASTIUM VOLCANICUM, Schl. (Linnæa, XII. 208). Pine forests, Mt. Orizaba, 11,000 ft., August (no. 213). The specimens referred to this species have the petals but slightly cleft. The species is a prominent element of the herbaceous flora at an altitude of 11,000 feet.

ARENARIA SERPENS, HBK. In pine woods, Mt. Orizaba, 13,000 ft., August (no. 234). As defined by Rohrbach (Linnæa, XXXVII. 268), many forms are included under this species. The Mt. Orizaba specimens, which seem best placed here, are closely related to *A. Bourgæi*, Hemsl., but differ in the spatulate leaves and in the petals only equalling or little exceeding the sepals.

DRYMARIA FILIFORMIS. Glabrous throughout, 3–8 inches high: stems erect or spreading from a slender rootstock, much branched, filiform, somewhat rigid: leaves thickish, short-petioled, ovate to lanceolate, narrowed at the base, 2–2½ lines in length, reduced to ovate bracts above: stipules setaceous: flowers slender-pedicelled, disposed in a diffuse cyme: sepals ovate, obtuse, herbaceous, scarious-margined, with a dark tip or midnerve, somewhat carinate, a line long: petals deeply cleft, shorter than the sepals: capsule globose, shortly stipitate, many seeded. — Barren slopes, Mt. Orizaba, 9,000 ft., August (no. 267). Resembling *D. anomala*, Wats., in habit, foliage, and somewhat in the inflorescence, but differing in the slender rootstocks, glabrous obtuse sepals, and much longer-pedicelled flowers at the nodes of the branches.

ASTRAGALUS (MOLLISSIMI) ORIZABÆ. Stem decumbent, branched, clothed with a short white tomentum, a foot or less high: leaves including petiole 4–6 inches long; leaflets 14–17 pairs, petiolulate, oblong-lanceolate, obtuse or acutish, somewhat cuneate at the base, 5–8 lines in length, white sericeous-pubescent: stipules narrowly deltoid, acuminate, 2–2½ lines long: peduncles shorter than the leaves: racemes oblong, 1½–2½ inches in length: bracts linear-lanceolate, 1¾ lines long, exceeding the pedicels: calyx sericeous-pubescent, 3–4 lines in length, the linear acuminate teeth three fourths as long as the

oblong-campanulate tube: corolla yellow, the keel tipped with violet; standard obovate, 7–9 lines long, much exceeding the keel: pods coriaceous, brown, broadly ovate or globose, very obtuse or abruptly pointed, 6–7 lines long, somewhat sulcate on both sutures, pubescent with short white woolly hairs. — Ledges and cliffs, Mt. Orizaba, 9,000 ft., August (no. 262). This species is closely related to *A. Humboldtii*, Gray, but differs essentially in its obtuse or abruptly pointed subglobose tomentulose pods.

Desmodium (Heteroloma) subsessile. Stem herbaceous, trailing, branched, somewhat hispid: stipules lanceolate, acuminate, ciliate, 3 lines long: petioles 1–1½ lines in length: lateral leaflets elliptic, occasionally with a couple of rounded lateral lobes, the terminal leaflets broadly ovate, rounded or retuse at the apex, rounded at the base, thinly appressed-pubescent on both surfaces, ciliate: racemes terminal and axillary, long-peduncled: bracts ovate, acuminate, ciliate, soon deciduous: pedicels in pairs, distant, spreading, 6–7 lines long: flowers about 4 lines in length: pods (immature) 5–6-jointed, the margins nearly equally notched; joints orbicular, 1½ lines long, finely uncinate-pubescent. — Wooded hills near Esperanza, 8,000 ft., August (no. 325). Near *D. Mexicanum*, Wats., but distinguished by its foliage.

Phaseolus (Drepanospron) Esperanzæ. Stem procumbent, stout, furrowed, hispidulous with reversed hairs, 3 feet or more in length: leaflets broadly ovate-triangular, 1¾–2 inches long, three fourths as broad, obtusely and hastately 3-lobed, the lateral leaflets often entire or with one large rounded lobe, strigulose above, pubescent on the nerves below; the lateral lobes rounded, the terminal triangular, obtuse, mucronate: racemes loosely many-flowered: bracts persistent, ovate-lanceolate, acute, ciliate, 2 lines long, shorter than the pedicels: calyx pubescent, 1¾ lines in length: corolla greenish yellow, tinged with purple, 6 lines long: pods (immature) villous, slightly curved, ¾ inch long, 2 lines broad. — Wooded hills near Esperanza, 8,000 ft., August (no. 371). Closely related to *P. pedicellatus*, Benth. (ex char.), but differing in the shorter pedicels and pubescent stems and leaves; also near *P. leptostachyus*, Benth. (ex char.), which has rhombic-ovate leaflets.

Eryngium (Parallelinervia) Seatoni, Coulter & Rose, n. sp. Stem erect, stout, 3–4 feet high: leaves linear, parallel-nerved; radical leaves 12–15 inches long, 4–5 lines wide, the margin toothed with paired spines, one much longer and about equal to the breadth of leaf; stem leaves all alternate, with marginal spines often in threes and

fours, clasping at base: heads few, terminal and axillary, shortly pedunculate, oblong, 10 lines long; involucre of 14 or 15 bracts, oblong-linear, sharp pungent, 2 inches or more long, with 3 or 4 pairs of spines or the inner ones sometimes entire; bractlets blue, pungent, a little longer than the flowers. — In pine woods, Mt. Orizaba, 12,000 ft., August (no. 197). Near *E. protæflorum*, but with more scattered stem leaves, narrower radical leaves, fewer bracts, and bearing several heads. Galeotti's no. 2763, which was found on this mountain at exactly this altitude and referred to *E. protæflorum*, is in all probability the above plant.

ARRACACIA NUDICAULIS, Coulter & Rose, n. sp. Acaulescent, glabrous, with slender peduncle, 3–12 inches high: leaves 4–7, pinnate; segments linear, entire or the lower ones 3–7-toothed or pinnatifid, the ultimate segment appendiculate: umbel somewhat unequal, 6–12-rayed; rays 1–2 inches long; pedicels 2–3 lines long: flowers white: fruit ovate, flattened laterally, $1\frac{1}{2}$ lines long: stylopodium conical, becoming inflexed; styles slender, thickened at tip. — Pine woods, Mt. Orizaba, 12,000 ft., August (no. 199).

GNAPHALIUM POPOCATEPECIANUM, Sch. Bip. Sandy plains, Mt. Orizaba, 14,000 ft., August (no. 242). This plant is the same as Schaffner's no. 50, Coulter's 451*, and one collected by Galeotti. Also very near *G. Liebmanni*, Sch. Bip. (ex char.).

IOSTEPHANE HETEROPHYLLA, Benth. Specimens of this plant collected in moist woods near Esperanza, 8,000 ft., August (no. 366), show the stem to be foliaceous to the summit and the rays dark red.

VIGUIERA PEDUNCULATA. Stem erect, about 3 feet high, smoothish, branched only at the summit: leaves opposite, distant, petiolate, coriaceous, undulate-serrulate, 3-nerved from the base, somewhat scabrous above, minutely pubescent on the nerves below; lower leaves deltoid, acute, about 3 inches long, $1\frac{1}{2}$–2 inches broad; the upper ovate, acute, cuneate at the base, $1\frac{1}{4}$–$2\frac{1}{4}$ inches in length: peduncles 1–3 at the ends of the branches, 5–11 inches long: heads solitary, $1\frac{1}{4}$–$1\frac{3}{4}$ inches in diameter: involucre 4 lines high; the bracts lance-linear, apiculate, pubescent: rays 12–15, 6–8 lines long, oblong-elliptic, minutely emarginate: bracts of the convex or subconical receptacle entire, cuspidate, about equalling the disk corollas: achenes oblong, finely pubescent, $1\frac{1}{2}$ lines in length: pappus awns chaffy-dilated at the base, nearly as long as the achene; the intermediate paleæ laciniate. — Wooded hills near Esperanza, 8,000 ft., August (no. 368). A species well characterized by its long-pedunculate heads.

ENCELIA STRICTA. Roots fibrous: stem simple, herbaceous, striate, hispidulous, about 2 feet high: leaves opposite below, alternate above, sessile, erect, somewhat appressed to the stem, oblong-ovate, 1–2¼ inches long, truncate, rounded or subcordate at the base, acute, appressed pubescent and somewhat scabrous above, finely and rather soft pubescent with whitish hairs beneath, irregularly callous-serrate: heads few, pedunculate, ¾–1½ inches broad: bracts of the involucre 2–3 lines high, ovate, acute, densely appressed-pubescent: rays 8–12, oblong-elliptic, entire or minutely 2–3 dentate, 5–7 lines long, golden yellow: achenes oblong-spatulate, 1–1½ lines in length, slightly emarginate: pappus of two delicate awns, half as long as the achene. — Grassy hills near Esperanza, 8,000 ft., August (no. 339). Near *E. hispida*, Hemsl. (ex char.).

CALEA MULTIRADIATA. Herbaceous, erect or decumbent: stem somewhat branched, hispidulous, 1–2½ feet high: leaves opposite, sessile or very short petioled, lanceolate to broadly ovate, rounded or subcordate at the base, acute, serrate with a few callous-tipped teeth, rough pubescent on both surfaces, the veins prominent beneath: heads long-peduncled, 1–3 at the ends of the branches: involucre 3–4 lines high; its bracts green, ovate, obtuse, glabrous, ciliate, striate, the outer ones a little shorter and thickened at the tip: rays 15–25, oblong-spatulate, 3–5 lines in length, 2–3-dentate, purplish white, striate: bracts of the receptacle slender, acuminate, shorter than the flowers: achenes black, pubescent, less than a line long, angled, narrowed at the base: pappus paleæ about 20, slender, setaceous, minutely dentate, persistent, considerably longer than the achenes and equalling the corollas. — Wooded slopes, Mt. Orizaba, 10,000 ft., August (no. 167). This species is related to *C. elegans*, DC., but amply distinguished by its pubescence, more equal involucral bracts, and the number, size, and shape of the rays; also near *C. sabazioides*, Hemsl. (ex char.), but differing in the leaves and involucre.

TAGETES LINIFOLIA. Glabrous, about a foot high: stems several from a short rootstock, erect or decumbent, simple or with a few branches from the woody base: leaves opposite, sometimes alternate above, pinnate: leaflets 3–5 pairs, mostly opposite, narrowly linear with attenuate base, very acute or shortly setaceous, entire or serrate at the apex: lateral leaflets 3–6 lines, the terminal about an inch in length: peduncles single, terminating the stems or branches, cylindrical, 3–5 inches long: heads solitary: involucre oblong, narrowed at the base, ½ inch high, somewhat angled, 5-toothed: rays 5, conspicuously obcordate, light yellow, 6–8 lines in length: disk flowers 25–40,

exceeding the involucre: achenes 3–3½ lines long, linear, angled, minutely appressed-pubescent: pappus of the disk achenes of 2 paleaceous awns equalling the achenes, and 3 much shorter oblong slightly fimbriate paleæ; of the ray short paleaceous. — Rocky hills near Esperanza, 8,000 ft., August (no. 355). Resembling *T. pedunculata*, Lag., and *T. tenuifolia*, Cav., in the characters of the flowers, but with narrower leaflets and more simple stems terminated by single peduncles.

Senecio Orizabensis, Sch. Bip. Specimens collected on sandy plains, Mt. Orizaba, 13,500 ft., August (no. 219), accord in every way with the description of this species (Hemsl. Biol. Cent. Am. Bot., II. 244), except in having runcinate radical leaves.

Euphorbia ramosa. Suffrutescent, 2–5 inches high: stems decumbent or erect, slender, much branched, pubescent with spreading hairs: leaves short-petioled, oblique at the base, ovate or suborbicular, acutish, crenulate or very entire, glabrous above, sparsely hairy beneath, 2–3 lines long: stipules minute, triangular, lacerate: involucres solitary or somewhat corymbose at the ends of the branches, short-pedicelled, campanulate, glabrous, ½ line long: glands purple: appendages small, white, entire: styles very short, deeply bifid: capsules glabrous, the valves obtusely angled: seeds ovate, 4-angled, irregularly and transversely rugose. — Rocky slopes, Mt. Orizaba, 10,000 ft., August (no. 495). Coulter's no. 1447 from Real del Monte also represents small specimens of this species. It is cited by Hemsley (Biol. Cent. Am. Bot., III. 90) as *E. adenoptera*, Bertol., but it is very distinct from that species, which has unequal involucral appendages and hirsute capsules. The specimens in the Gray Herbarium were unnamed, but the following characters had been noted upon the sheet by Dr. Engelmann: "Stem and lower side of oblique ovate or orbicular crenulate or entire leaves hairy: stipe 3-angular, ciliate: involucre with small white and wide appendages: styles divided to the middle: capsule obtuse-angled: seeds sharp-angled, dark, cross-grooved, 0.5 line." The specimens were mounted on the same sheet with *E. pilosula*, Engel., and the two are nearly related in their pubescence and flower and fruit characters, but *E. pilosula* is a much smaller plant with distinctly serrate leaves. The specimens from Mt. Orizaba, varying from 2 to 5 inches in height, differ only from Dr. Coulter's plant in being apparently more erect, and they somewhat resemble in habit *E. Fendleri*, Torr. & Gray, and smaller forms of *E. villifera*, Scheele.

Arundinella Deppeana, Nees in Bonplandia, III. 84; Steud. Syn. Gram. 115; Fourn. Mex. Pl. Enum., Gram. 54. — Hills near

the town of Orizaba, 4,000 ft., August (no. 290). Equals no. 1552 of Wright's Cuban Coll., and Pringle's nos. 2615 and 3133. Not *A. Brasiliensis*, Raddi, as figured by Trinius (Icon. 266). Hemsley (Biol. Cent. Amer. Bot., III. 252) unites *A. aleutica*, Rupr., and *A. latifolia* and *A. scoparia*, Fourn., with *A. Deppeana*, Nees.

ORYZOPSIS PUBIFLORA (Trin.), Scribner. (Ex descrip. *Urachne pubiflora*, Trin. & Rupr. Stipac. 21; *Nasella pubiflora*, Desv. Flor. Chil. 264.) Culms slender, 2 feet high, with an open few-flowered panicle: spikelets 2–2½ lines long; empty glumes lanceolate, subequal, 3-nerved, with abruptly acuminate hyaline tips; flowering glume, including the short conical and curved callus, 1¼ lines long, obliquely truncate at the broad apex, and pilose all over with appressed hairs: hairs on the callus short and dense: awn about 6 lines long, twice geniculate, minutely ciliate below, scabrous above, readily falling off: anthers bearded at apex. — Hills near Esperanza, 8,000 ft., August (no. 319). Equals no. 2018 of Bang's 1891 collection.

MUHLENBERGIA SEATONI, Scribner, n. sp. Panicle diffuse, the upper branches widely spreading; flowering glume four times as long as the obtuse empty glumes, bifid at apex, the divisions setiform; awn about three times the length of the flowering glume.

Perennial: culms smooth, slender, branching near the base, 8–12 inches high (including the panicle): leaves linear-filiform, 2–3 inches long; ligule prominent, hyaline: panicle nearly one half the length of the culm, the lower branches ascending, partly included in the upper leaf-sheath; pedicels long and capillary, much exceeding the spikelets: spikelets about 2 lines long; empty glumes small (½ line), rounded, obtuse, the second a little longer and broader than the first: callus conspicuous, hairy on the anterior side: palea broad, nearly equalling its glume in length: awn about 6 lines long. — Hills near Esperanza, 8,000 ft., August (no. 320). It is allied to *M. capillaris*, Trin., but quite distinct.

AGROSTIS VERTICILLATA, Vill. Delf. 74; Trin. Unif. 195; Trin. Icon. 36. Kunth (Enum. Pl. I. 219) refers this to *A. stolonifera*, L., but there is some confusion in regard to the Linnæan plant. Munro, in his "Catalogue of the Grasses in the Herbarium of Linnæus," says, under *A. stolonifera*, that "the Herbarium contains one of the forms of *A. vulgaris* which is called *stolonifera*, the Florin grass; another marked *stolonifera* by Linnæus is *A. verticillata*, Vill." — Mt. Orizaba, 10,000 ft., August (no. 192).

CALAMAGROSTIS SCHIEDEANA, Steud. Gram. 193. (Ex descrip. *Deyeuxia Schiedeana*, Rupr. ex Fourn. Mex. Pl. Enum., Gram. 105.)

— Culms 12 to 18 inches high, with long involute erect leaves, and a short lax panicle: spikelets sometimes 2-, very rarely 3-flowered, 3–3½ lines long; empty glumes lanceolate, acuminate; flowering glume broadly lanceolate, pilose all over, laciniate at apex: awn from near the middle on the back, 2–3 lines long, bent and a little twisted below; rudiment nearly half as long as the floret, pilose: hairs on callus short, one fifth as long as the glume. — Mt. Orizaba, 14,000 ft., August (no. 227 a).

TRISETUM ELONGATUM, Kunth, Gram. I. 101, Enum. Pl. I. 296. This appears to be the same as *T. interruptum*, Buckley, and is probably the *T. interruptum* of Fournier. — Mt. Orizaba, 12,000 ft., August (no. 191).

TRIODIA AVENACEA, HBK. Nov. Gen. 156, t. 48. (*Uralepis avenacea*, Kth.; Fourn. Mex. Pl. Enum., Gram. 110.) — Mt. Orizaba, 9,000 ft., August (no. 248). Equals Pringle's no. 3930 and Schaffner's 1008. Spikelets 6–8-flowered, about 4 lines long; empty glumes unequal, the larger second one 2½ lines long; first flowering glume 2 lines long, oblong, deeply notched at apex, awned between the divisions: awn about 1 line long.

ERAGROSTIS LUGENS, Nees. S. Wats. in Proc. Am. Acad. XVIII. 182. — Hill near Esperanza, 8,000 ft., August (no. 318). Equals Pringle's no. 472. I have this species from Louisiana, collected in cultivated fields at Lafayette by A. B. Langlois, Sept. 25, 1885.

FESTUCA TOLUCENSIS, HBK. Nov. Gen. I. 153? — Mt. Orizaba, 12,000 ft., August (no. 193). Equals Pringle's no. 5201. This, and also no. 228 of same collection, appear to me to be only varieties of *Festuca ovina*, L. The no. 228 may be Fournier's *F. æquipetala*.

FESTUCA RUBRA, L., var. PAUCIFLORA, Scribner, n. var. Spikelets 3-flowered: upper flower imperfect: empty glumes unequal; the lower shorter and narrower: flowering glumes lanceolate, acuminate, submucronately pointed, scabrous on the back. — Mt. Orizaba, 13,000 ft., August (no. 227 b). This may be *F. Willdenoviana*, Schult., but it appears to be only a variety of *F. rubra*, L.

BROMUS HOOKERI, Fourn., var. SCHLECHTENDALII, Fourn. Mex. Pl. Enum., Gram. 127. — Mt. Orizaba, 10,000 ft., August (no. 189). Equals Pringle's no. 1173. This has been referred to *B. carinatus*, Hook., but upon what authority I do not know. Hooker's species does not appear to be clearly known.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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BY B. L. ROBINSON.

Mo. Bot. Garden,
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IX.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY, NEW SERIES.

V. — THE NORTH AMERICAN SILENEÆ AND POLYCARPEÆ.

By B. L. Robinson.

Presented April 12, 1893.

The following study of the *Sileneæ* and *Polycarpeæ* is preliminary to treatment of these tribes of the *Caryophyllaceæ* in the "Synoptical Flora of North America." The object of the present publication is chiefly to secure aid through criticisms, and to call attention to such species, especially in the genera *Silene* and *Lychnis* as are still imperfectly known, so that if possible more complete material of them may be secured before final revision for the first volume of the Synoptical Flora. Specimens of these groups, especially puzzling forms from the West and Northwest, together with notes concerning any points not properly covered by the following descriptions, will be gratefully received by the author, who here cordially acknowledges the valuable assistance already rendered him in his work by the late Dr. George Vasey and Dr. J. N. Rose, of the Department of Agriculture; Prof. N. L. Britton of Columbia College; Mr. and Mrs. T. S. Brandegee and Miss Alice Eastwood, of the California Academy of Sciences; Prof. John Macoun, of the Canadian Geological Survey; Mr. John H. Redfield, of the Philadelphia Academy of Natural Sciences; Mr. John Donnell Smith, and others, whose names are mentioned in the text. In the enumeration of synonyms and the citation of literature Dr. Sereno Watson's "Bibliographical Index" has been a most useful guide; so far as possible, however, all references to literature as well as points of synonymy, from whatever source, have been subjected to careful verification.

CARYOPHYLLACEÆ, Tribe I. SILENEÆ. Sepals united into a 4–5-toothed or lobed tube or cup. Petals unguiculate and often scale-bearing at the junction of the blade and claw, borne together with

the stamens upon the stipe of the ovary. Stipules none. Flowers usually showy, perfect or not infrequently polygamous.

* Calyx subtended by 1–several pairs of bractlets: flowers solitary or often aggregated in close heads: seeds flattened and attached by the face: embryo nearly straight.

1. Dianthus. Calyx tubular, 5-toothed, finely many-striate. Petals 5, with long claws; the blade entire, emarginate, or several-toothed. Stamens 10. Styles 2. Capsule 1-celled, dehiscent by 4 valves. Leaves narrow, often connate by narrow scarious membranes. Flowers commonly showy.

2. Tunica. Calyx turbinate or cylindrical, obtusely toothed, distinctly 5-ribbed, or sometimes 15-ribbed. Petals 5. Stamens 10. Styles 2. Flowers considerably smaller and habit more slender than in *Dianthus*.

* * Calycine bractlets none: seeds laterally attached: embryo curved.

← Styles 2: capsule 4-toothed or valved: introduced plants.

3. Gypsophila. Calyx turbinate, tubular or campanulate, 5-toothed, herbaceous only in the middle of the segments, the intermediate parts being scarious. Petals 5. Stamens 10. Flowers mostly small, paniculate or scattered, rarely aggregated. Capsule rather deeply 4-valved.

4. Saponaria. Calyx tubular or ovoid, 5-toothed, terete with numerous faint veins, or conspicuously 5-angled. Flowers showy. Petals 5. Stamens 10. Capsule dehiscent at the apex by 4 short teeth.

← ← Styles normally 3; capsule opening by 3 or 6 teeth: calyx commonly 10-nerved, rarely ∝-nerved.

5. Silene. Calyx 5-toothed, campanulate, subcylindric or turbinate, either inflated or becoming distended by the maturing capsule, 10–∝-nerved. Petals usually appendaged at the summit of the claw; the blade variously toothed or divided, rarely entire. Stamens 10. Styles 3 (very rarely 4). Stipe of the ovary commonly developed. The capsule 1-celled or somewhat 3-celled at the base. Flowers solitary, racemose, or cymose-paniculate.

← ← ← Styles 5 (rarely 4), alternating with the petals when of the same number: calyx teeth short, not foliaceous.

6. Lychnis. Calyx ovoid, obovate, or clavate, 5-toothed, 10-nerved, inflated or not. Petals with or without appendages; the blade entire, emarginate, bifid or variously cleft. Stamens 10. Ovary 1-celled, or divided at the base into 5 (rarely 4) partial cells. Capsule dehiscent by as many or twice as many teeth as there are styles.

← ← ← ← Styles 5, opposite the petals: calyx teeth conspicuously prolonged into foliaceous appendages.

7 Agrostemma. Calyx ovoid, with 10 strong ribs; the elongated teeth in our introduced species an inch or more in length, exceeding the 5 large unappendaged petals. Stamens 10. Capsule 1-celled. Leaves linear.

Tribe II. ALSINEÆ. Sepals free or nearly so. Petals not distinctly unguiculate, never appendaged. Styles 2–5, distinct to the base. — Including genera 8–14; to be published at an early date.

Tribe III. POLYCARPEÆ. Sepals free or somewhat united at the base. Petals commonly small, not distinctly unguiculate, borne together with the stamens upon an hypogynous or slightly perigynous disk. Style simple below, 3- or more rarely 2-branched above. The stigmas rarely sessile on the ovary.

* Petals 2–5-parted.

15 Drymaria. Sepals 5, often scarious-margined. Petals 5. Stamens 3–5, slightly perigynous. Ovary 1-celled, several–many-ovuled. Capsule 3-valved. Flowers small, greenish white. Leaves flat, though often narrow, opposite or pseudoverticellate. Stipules small, free, scarious or bristle-formed, sometimes fugacious.

* * Petals entire, denticulate, or none.

← Cauline leaves numerous, flat, not linear-setaceous.

16. Polycarpon. Sepals 5, more or less carinate, entire, scarious-margined. Petals 5, small, shorter than the sepals, sometimes emarginate. Stamens 3–5. Ovary 1-celled. Capsule 3-valved, several-seeded. Seeds ovoid with the embryo but little curved.

← ← Cauline leaves setaceous.

17. Lœflingia. Sepals 5, carinate and produced to rather rigid setaceous tips; the three outer ones commonly bearing a setaceous tooth on each side. Petals 3–5, small or none. Stamens 3(–5 ?). Ovary 1-celled, several-seeded, triangular. Capsule 3-valved. Seeds oblong, attached laterally near the base. Embryo somewhat curved. Cotyledons accumbent.

← ← ← Leaves forming a radical rosette; the cauline minute or obsolete: basal stipules lacerate.

18. Stipulicida. Sepals 5, distinct, somewhat rigid, obtuse, emarginate, scarious-margined. Petals 5, entire, narrowly oblong, gradually contracted below, hypogynous. Stamens 5. Capsule ovate-globose, 3-valved, many-seeded.

1. DIANTHUS, L. · Pink, Carnation. (Διός and ἄνθος, flower of Jove.) — Chiefly natives of S. Europe and N. Africa, deservedly popular in cultivation. — Gen. n. 364; DC. Prodr. i. 355; Reichb. Icon. Fl. Germ. vi. t. 248–268; Benth. & Hook. Gen. i. 144. — Several species tend to escape and have become more or less naturalized. One variety only is indigenous to this continent.

* Indigenous in the extreme Northwest.

D. alpinus, L. Low cespitose perennial with numerous ascending 1-flowered stems: bracts 2–6, erect or somewhat spreading. — Spec. 412; Regel, Ost-Sib. i. 284. — (Eur., Siberia.) Very variable and according to Regel passing into the following.

Var. repens, Regel. Root single, vertical or descending, not repent: stems procumbent, much branched from near the base: branches simple, ascending, 3–6 inches in height, most often 1-flowered: leaves linear or linear-lanceolate, 8–16 lines long, glabrous, slightly fleshy: involucral scales a single pair, narrowly ovate, acuminate, nearly equalling the calyx, the attenuated tips slightly spreading: calyx somewhat inflated, 6 lines long: corolla purple, about 7 lines broad, glabrous, the obovate blade erose-dentate. — Regel, l. c. 286. *D. repens*, Willd. Spec. ii. 681; Cham. et Schlecht. Linnæa, i. 37; Torr. & Gray, Fl. i. 195; Seem. Bot. Herald, 27, t. iv. — Northern and western coast of Alaska. (Siberia.)

* * Adventive from Europe and more or less established in various localities in the Eastern and Middle States.

← Bractlets short, half the length of the calyx: flowers solitary.

D. deltoides, L. (Maiden Pink.) Perennial: stems decumbent, ascending, a foot in height, very leafy below: leaves short, lanceolate, a line wide, the lower obtusish, the uppermost acute: calyx long, tubular: petals narrow, pink or white. — Spec. 411; Eng. Bot. i. t. 61; Gray's Man. ed. 6, 83. — Occasionally found escaped from gardens, New England to Michigan.

← ← Bractlets narrow, attenuate, equalling or exceeding the calyx: flowers clustered.

D. barbatus, L. (Sweet William.) A smooth perennial, 1–2 feet in height: stems simple, bearing the flowers in dense cymose fascicles: leaves lanceolate, large for the genus, 1½–3 inches long, a fourth as wide, minutely roughened on the edges: bractlets filiform from a lanceolate base: blade of petals triangular-obovate, toothed, red, purple or white, often variegated in cultivation. — Spec. 409; Reichb. Icon. Fl. Germ. vi. t. 248. — Long cultivated and occasionally spontaneous about old gardens.

D. ARMERIA, L. (DEPTFORD PINK.) Annual, 1–2 feet high, covered with a fine grayish pubescence: stems branching and bearing several 2–4-flowered fascicles: bracts subulate, attenuate, villous: flowers scentless: calyx slender, tubular, 7–8 lines long, the teeth very sharp: petals roseate, spotted with white; the blade elliptical, crenate-dentate. — Spec. 410; Pursh, Fl. 314; Bigel. Fl. Bost. 108; Torr. Fl. N. & Mid. St. 447; Torr. & Gray, Fl. i. 195. *D. armeroides*, Raf. in Desv. Journ. Bot. 1814, 269; Précis des Decouv. 36. *Atocion armerioides*, Raf. Autikon Bot. 29. *D. Carolinianus*, Walt. Car. 140, referred here by Sprengel, Syst. ii. 375, was without doubt founded upon error. Torrey & Gray, Fl. i. 676, state that Walter's own specimen was *Dodecatheon Meadia*. — Fields and pine woods, Eastern States from Maine (Portland Catalogue) to Maryland; Lansing, Michigan, *L. H. Bailey;* fl. June and July. Autumnal flowers in October noted by *L. F. Ward*.

← ← ← Bractlets broad, scarious, concealing the calyx.

D. PROLIFER, L. Annual, a foot or two in height: stems wiry: leaves narrow, minutely scabrous, acute: heads terminal, 2–several-flowered, enclosed in thin dry ovate obtusish mucronate imbricated bractlets: flowers expanding one at a time, ephemeral: calyx tubular; the veins faint, collected into five groups: petals small, notched, pink or red. — Spec. 410; Eng. Bot. xiv. t. 956. *Tunica prolifera*, Scop. Fl. Carn. ed. 2, i. 299. — New Jersey, *Durand;* Eastern Pennsylvania, *Smith, Porter;* Suffolk Co., N. Y., *Hollick;* fl. all summer. This species, especially in its calyx, forms a transition to the next genus.

2. TUNICA, Scop. (*Tunica*, a tunic, probably in reference to the close involucre.) Slender wiry-stemmed herbs with small mostly linear leaves. Flowers terminal, solitary or fascicled in small heads. — Fl. Carn. ed. 2, i. 298; Benth. & Hook. Gen. i. 145; Williams, Journ. of Bot. xix. 193 (1890). — Old World plants represented in America by a single species recently introduced.

T. SAXIFRAGA, Scop. Smooth: stems numerous, slender, branching, curved ascending: leaves small, linear, acute, less than half a line in width: the lower internodes very short: flowers small, numerous, terminal, solitary: bractlets 2 pairs, scarious except in the middle, acute, considerably shorter than the calyx: petals notched, pale purple; the blade a line in length. — Scop. l. c. i. 300; Reichb. Icon. Fl. Germ. vi. t. 246. — Roadsides near London, Ontario, *Burgess*. (Adventive from Europe.)

3. GYPSOPHILA, L. (γύψος, gypsum, and φιλεῖν, to love, from a supposed preference for soil rich in gypsum.) — Old World

herbs of graceful habit, mostly natives of Southern Europe and Western Asia. Several species are cultivated for ornament; the following are sparingly naturalized. — Gen. ed. 4, n. 498; DC. Prodr. i. 351 in part; Reichb. l. c. vi. t. 239–242; Benth. & Hook. Gen. i. 146; Williams, Journ. of Bot. xviii. 321.

G. MURALIS, L. Low, annual, with the habit of *Arenaria*. leaves small, linear, acute: flowers scattered in the forks of the branches: pedicels filiform, two or three times as long as the calyx: petals pink with darker veins, emarginate, 2–3 lines in length. — Amœn. Acad. iii. 24; Spec. ed. 3, 583; Fl. Dan. viii. t. 1268. — Ballast and roadsides, New Jersey, *Brown;* Montague, Mass., *Churchill;* Wethersfield, Conn., *Wright;* London, Canada, *Dearness.* Introduced (N. and Mid. Europe and Siberia).

G. PANICULATA, L. l. c. Perennial, glabrous and somewhat glaucous, 2 feet or more in height: leaves lanceolate, acute, 1–1½ inches in length: flowers very numerous in a compound panicle segments of the calyx with conspicuous white scarious margins: petals scarcely exceeding the sepals: capsule nearly spherical. — Reichb. l. c. vi. t. 242. — Doubtfully established, Emerson, Manitoba, *Fowler.* (Adventive from Europe.)

4. SAPONARIA, L. SOAPWORT. (From *sapo*, soap; *S. officinalis* having been used as a substitute for soap, the juice being capable of forming a lather.) — A genus of the Old World including plants of diverse habit. Two rather coarse species belonging to different sections of the genus are spontaneous in America. — Gen. n. 365; DC. Prodr. i. 365; Benth. & Hook. Gen. i. 146.

S. VACCARIA, L. A smooth annual with ovate or oblong-lanceolate, sessile and somewhat connate leaves: flowers in a broad flat corymb: calyx ovoid, with 5 sharp herbaceous angles, the intervening parts being white and scarious: corolla rose-colored, destitute of appendages. — Spec. 409; Bot. Mag. t. 2290; Torr. & Gray, Fl. i. 195; also variously referred by authors to *Gypsophila*, *Lychnis*, or more often regarded as an independent genus, *Vaccaria.* — Railway ballast and cultivated ground, frequent and sometimes troublesome in wheatfields westward, where it bears the name of "cockle." July-August. (Introduced from Europe.)

S. OFFICINALIS, L. (SOAPWORT, BOUNCING BET.) Perennial, smooth, 1½–2 feet high: leaves ovate-lanceolate, acute, 3-ribbed, 2–3 inches long, narrowed at the base; inflorescence terminal, somewhat pyramidal, the flowers clustered at the ends of short branches: calyx tubular, terete: petals appendaged at the junction of the claw and the

obovate retuse blade, white or pink, often double. — Spec. 408; Eng. Bot. xv. t. 1060; Pursh. Fl. 314; Torr. & Gray, Fl. i. 195. — Roadsides and waste ground, common; July to the end of October. (Naturalized from Europe.)

5. SILENE, L. Catchfly, Campion. (Name from Σειληνός, in reference to the viscid excretion of many species, the Greek god having been described as covered with foam; also derived directly from σίαλον, saliva.) — A large genus of attractive plants inhabiting chiefly the northern temperate parts of the Old World, but also well represented in North America, especially in the Pacific region, where it has lately been necessary to increase considerably the number of species. Although the members of the genus present considerable diversity of habit and floral characters, yet they do not fall into well marked groups and the elaborate subdivision of the genus suggested by Rohrbach cannot be satisfactorily carried out among our American species. — Gen. n. 372; Otth in DC. Prodr. i. 367; Torr. & Gray, Fl. i. 189; Fenzl in Ledeb. Fl. Ross. i. 303; Reichb. Icon. Fl. Germ. vi. t 269–301; Benth. & Hook. Gen. i. 147; Rohrb. Monog. der Gatt. Silene; Wats. Proc. Am. Acad. x. 340, & Bibl. Index, 106.

*** Annuals, mostly introduced.**

+ Inflorescence simply racemose, or subspicate; pedicels solitary.

S. Gallica, L. Stem hirsute with white jointed hairs: leaves spatulate, obtuse, mucronate, hirsute-pubescent on both sides, 8–18 lines in length: racemes terminal, one-sided, 2–4 inches long: flowers more or less pedicellate: calyx 10-nerved, villous-hirsute, slender and subcylindric in anthesis, becoming in fruit broadly ovoid, with contracted orifice and short narrow spreading teeth: petals usually little exceeding the calyx; the blade obovate, somewhat bifid, toothed or entire. — Spec. 417; Cham. & Schlecht. Linnæa, i 40; Rohrb. l. c. 96. *S. Anglica*, L. l. c. 416. — Apparently of European origin but now cosmopolitan; locally common on the Pacific slope from British Columbia to Lower California; occasionally in cultivated fields in the Atlantic States; April–July. The typical form has very short ascending pedicels and white or pink flowers. S. Lusitanica, L. l. c. 416, is a form with the lower pedicels elongated, equalling or exceeding the calyx, and becoming horizontal in fruit. Tolon, Calif., *Brandegee*. (Europe.)

Var. quinquevulnera, Koch. Petals more showy, subentire, deep crimson with a white or pink border. — Synop. Fl. Germ. et Helv. 100. *S. quinquevulnera*, L. l. c. 416. — With the typical form.

S. NOCTURNA, L., although credited to this country by Torr. & Gray and by various subsequent authors, is not represented from America in the leading herbaria of the country. Most if not all of the specimens referred here are either *S. Gallica* or *S. noctiflora*.

+ + Inflorescence dichotomously racemose.

S. DICHOTOMA, Ehrh. Tall, more or less hirsute and viscid: root annual or biennial: leaves lanceolate or oblanceolate: flowers short-pedicelled or subsessile, larger than in the preceding, ½ inch in diameter: petals white or roseate, the blade obovate, more or less deeply bifid: calyx cylindric in anthesis, becoming ovate in fruit, the prominent green nerves strictly simple, hirsute. — Beitr. vii. 143. Reichb. l. c. vi. t. 280. — A European species somewhat intermediate between *S. Gallica* and *S. noctiflora*; ballast and waste land, Philadelphia, *Martindale*; Trenton, *Volk*; Texas, *Nealley*. The form RACEMOSA, Rohrb., *S. racemosa*, Otth in DC. Prodr. i. 384, with more pubescent leaves tending to be clustered about the base has been found by *Prof. Greene* sparingly introduced in fields about Berkeley, Cal. Fl. Francis. i. 116.

+ + + Inflorescence cymose or paniculate, not distinctly racemose.

++ Calyx equally and conspicuously 20–25-nerved.

S. multinervia, WATS. Erect, a foot high, pubescent throughout and somewhat viscid-glandular above: leaves narrowly oblong or linear, acute: inflorescence cymose with unequal branches: calyx ovate in fruit, contracted above, 5 lines long: petals small, purplish, unappendaged, not exceeding the subulate spreading calyx teeth: capsule narrowly ovate. — Proc. Am. Acad. xxv. 126; Zoe, i. 254. — Southern California, near Jamuel, *Orcutt*: island of Santa Cruz, *Brandegee*; Santa Monico Range, *Hasse*. This anomalous species is strongly characterized among indigenous Silenes by its many-nerved calyx, which places it in the Mediterranean § *Conosilene*. The California botanists are inclined to regard it as an introduced plant, and Davidson, in Erythea, i. 58, erroneously reduces it to *S. conoidea*, of the Old World, a species which differs in its larger flowers, longer and more attenuate calyx teeth, and long-necked flask-shaped capsules.

++ + Calyx 10-nerved.

= Viscid-pubescent or hirsute.

S. NOCTIFLORA, L. A coarse species a foot or two in height with lanceolate or ovate-lanceolate leaves 2–3 inches long: flowers usually few in loose cymes, fragrant: calyx large, in fruit ovoid, white with green nerves tending to anastomose: the teeth attenuate: petals bifid. —Spec. 419; Eng. Bot. v. t. 291; Torr. & Gray, Fl. i. 192; Gray's

Man. ed. 6, 85. — Roadsides and cultivated grounds, June to September. (Nat. from Eur.)

= = Smooth or nearly so, a part of each of the upper internodes glutinous.

S. antirrhina, L. (Sleepy or Snapdragon Catchfly.) Stem 6 inches to 3 feet in height: leaves oblong-lanceolate or linear, commonly acute: flowers rather numerous, small, ephemeral, borne in a compound cyme; pedicels long, filiform: calyx smooth, green, ovoid in fruit, about 4 lines long, contracted above; the teeth short: ovary scarcely stiped: petals small, pink or white, more or less emarginate or bifid. — Spec. 419; Otth in DC. Prodr. i. 376; Torr. & Gray, Fl. i. 191; Rohrb. l. c. 173; Mart. Fl. Bras. xiv. 2, t. 66. *Saponaria dioica*, Cham. & Schlecht. Linnæa, i. 38. — Waste places, common, widely distributed throughout the United States and Canada (also S. Am.); very variable in size and foliage.

Var. linaria, Wood. "Very slender: leaves all linear except the lowest which are linear-spatulate; calyx globular. Ga. and Fla." — Wood, Class-Book, ed. of 1861, 256, & Bot. & Fl. 53; Wats. Bibl. Index, 107.

Var. divaricata. Very slender: leaves linear or lance-linear, not exceeding an inch in length: branches filiform divaricate: calyx ovoid, 2–2½ lines long; petals wanting. — Rockford, Ill., *M. S. Bebb, G. D. Swezey.*

S. Armeria, L. Leaves elliptic or ovate-elliptic: flowers borne at the ends of the branches in small close cymes: pedicels short: calyx slender, clavate, 6–8 lines long: ovary long-stiped: petals pink, subentire or minutely toothed; appendages lanceolate acute. — Spec. 420; Torr. & Gray, Fl. i. 194; Reichb. l. c. vi. t. 284. — Occasionally found on roadsides and in fields, having escaped from gardens.

* * Perennial, subacaulescent, very low and densely matted.

S. acaulis, L. (Moss Campion.) Closely cespitose, an inch or two in height: leaves linear, crowded on the branching rootstocks: flowers small, 2–3 lines in diameter, subsessile or raised on naked curved peduncles 2–6 lines long: calyx narrowly campanulate, 2–3 lines long, glabrous; the teeth short, rounded: petals purplish, rarely white, entire, retuse or bifid, minutely appendaged. — Spec. ed. 2, 603; Reichb. Icon. Fl. Germ. vi. t. 270. *Cucubalus acaulis*, L. Spec. 415. *Lychnis acaulis*, Scop. Fl. Carn. ed. 2, i. 306. — An arctic and high alpine species, widely distributed and somewhat variable. Arctic America to the White Mts.; extending along the Rocky Mts. from Alaska to Arizona, also found in the Cascade Mts. (Eur. and Asia.) A some-

what caulescent form, with very slender elongated leaves 1–1½ inches in length, has been found in the Rocky Mountains of Colorado, *Miss Eastwood*, and Arizona, *Rothrock*. It is connected, however, with the typical form by gradual transitions.

* * * Caulescent perennials.

+ Eastern and Southern species.

++ Calyx inflated, flowers white or pink, scattered or panicled.

S. CUCUBALUS, Wibel. (BLADDER CAMPION.) Glaucous: stems ascending, a foot or more in height, leafy below, smooth or somewhat rough-pubescent: leaves opposite, usually lanceolate, acute: bracts much smaller: flowers polygamo-diœcious: calyx campanulate to subglobose, strongly inflated, glabrous, finely reticulated between the inconspicuous nerves: petals narrow, 2-cleft, scarcely crowned, white or pink. — Prim. Fl. Werth. 241; Rohrb. l. c. 84; Gray's Man. ed. 6, 84. *S. inflata*, Smith, Fl. Brit. ii. 467; Gray's Man. ed. 5, 89; Warming, Bot. Foren. Festskr. 1890, 258. *Cucubalus Behen*, L. Spec. 414. — Fields and roadsides, New Brunswick to Illinois. (Nat. from Europe.)

S. nivea, OTTH. Stem smooth or minutely pubescent above, 1½–3 feet in height: leaves opposite, lanceolate, attenuate-acuminate, smooth or pulverulent-pubescent: flowers rather few, nodding, borne in the forks of the branches: bracts foliar: calyx oblong in anthesis, fine-pubescent or smooth; nerves inconspicuous, anastomosing, the teeth short, triangular, obtuse: petals cuneate-obovate, bearing two short blunt appendages. — Otth in DC. Prodr. i. 377; Torr. & Gray, Fl. i. 190; Rohrb. l. c. 87. *S. alba*, Muhl. Cat. 45 (nomen subnudum). *Cucubalus niveus*, Nutt. Gen. i. 287. — Pennsylvania and Washington, D. C., to S. Illinois, Iowa, and Minnesota; rare.

S. stellata, AIT. (STARRY CAMPION.) Stems 2–3 feet high: leaves in whorls of 4 (the lowest sometimes opposite), ovate-lanceolate, acuminate, 2–3 inches long, half as broad: flowers in an open panicle: calyx campanulate, 4–5 lines in length; the teeth broad, acuminate: petals laciniately cleft, unappendaged. —Kew. ed. 2, iii. 84; Torr. Fl. N. Y. i. 100, t. 16. *Cucubalus stellatus*, L. Spec. 414; Sims, Bot. Mag. t. 1107. — Woodland, frequent, S. New England to Minnesota, southward to Virginia and Texas.

++ Calyx not inflated, distended only by the enlarging capsule.

= Flowers white or rose-colored.

S. ovata, PURSH. Pubescent or smooth: stems several from the same root, 2–4 feet in height; leaves ovate to ovate-lanceolate, attenuate-acuminate, 3–5 nerved from the rounded base, sessile, subconnate, 3–5 inches long: flowers borne in a narrow terminal leafless panicle:

calyx tubular, 3–4 lines in length, 10-nerved: petals white, the blade dichotomously cleft into linear segments. — Fl. i. 316; Torr. & Gray, Fl. i. 190; Chapm. Fl. 51. *Cucubalus polypetalus*, Walt.? Car. 141. — Alluvial woods, uplands, North Carolina to Georgia and Alabama.

S. Baldwinii, Nutt. Villous: stems low, weak, decumbent, throwing out runners: lower leaves spatulate obtuse, with an attenuate base; the upper oblanceolate or lanceolate, acute: flowers few, very large, 1½ inches or more in diameter, pedicellate, aggregated at the ends of the stems: calyx clavate, pubescent, 10 lines in length; the teeth ovate-lanceolate, acuminate: petals white or pink, the large obovate blade fringed, unappendaged. — Gen. i. 288; Torr. & Gray, Fl. i. 193; Chapman, Fl. 51. *S. fimbriata*, Bald. in Ell. Sk. i. 515, not of Sims. *Melandryum Baldwini*, Rohrb. l. c. 231; Wats. Bot. King Exp. 431. — Georgia and Florida, March to May.

S. nutans, L. Stems slender, a foot or more in height, leaves mostly at the base, spatulate; the cauline small, lanceolate: flowers in a slender, little branched panicle, nodding, 6–7 lines in diameter: calyx cylindrical in anthesis, not exceeding 5 lines in length: petals white or rose-colored, bifid (rarely 4-fid), segments narrow: capsule large ovate-conical. — Spec. 417; Reichb. l. c. vi. t. 295. — Introduced on Mt. Desert, *Miss Minot.* (Europe and Siberia.)

S. Pennsylvanica, Michx. (Wild Pink.) Viscid-pubescent: stems few or many, 6–9 inches high, from a strong tap-root: leaves mostly at the base, spatulate or oblanceolate, usually acutish at the apex, tapering below to long ciliated petioles; the two or three pairs of cauline leaves much shorter, lanceolate or narrowly oblong, acute: cymes small, terminal, dense, rarely more open: calyx clavate, purplish; the teeth short: petals white or pink, appendaged; the blade obovate, erose, 4–6 lines in length: the ovary long-stiped. — Fl. i. 272; Bot. Reg. iii. t. 247; Hook. Fl. Bor.-Am. i. 90; Gray, Gen. ii. 42, t. 115. *S. cheiranthoides*, Poir. Dict. vii. 176. *S. incarnata*, Lodd. Cab. t. 41. *S. platypetala*, Otth in DC. Prodr. i. 383. *Melandryum Pennsylvanicum*, Rohrb. l. c. 233, & Linnæa, xxxvi. 251. *S. Caroliniana*, Walt. Car. 142, with scarlet or crimson petals, and *S. rubicunda*, Dietr. Allg. Gartenzeit. iii. 196, with divided petals, are doubtful synonyms. — Open rocky woods, E. New England to S. Carolina and Kentucky.

= = Flowers crimson or scarlet, large.

S. Virginica, L. (Fire Pink, Catchfly.) Viscid-pubescent: stem striate, single, simple, 1–2 feet high: leaves spatulate or oblanceolate; the lower ones narrowed to ciliate-fringed petioles; the upper

lanceolate, sessile: flowers very large, an inch or more in diameter, loosely cymose; the central ones commonly nodding or reflexed after anthesis: calyx clavate or oblong, 8 lines in length, becoming obovate in fruit: petals crimson; the blade broadly lanceolate, 2- (rarely 4-) toothed at the apex. — Spec. 419 in part, not Willd.; Bot. Mag. t. 3342; Torr. & Gray, Fl. i. 192; Chapm. Fl. 51. *S. Catesbæi*, Walt. Car. 142. *S. coccinea*, Moench, Meth. Suppl. 306. — Common in open woods, on rocky hills, W. New York, S. W. Ontario (acc. to *Macoun*) to Minnesota (acc. to *Upham*), southward to Georgia and Arkansas.

S. rotundifolia, Nutt. (Round-leaved Catchfly.) Viscid-pubescent: stems weak, decumbent, branched: leaves rather large, varying from broadly lanceolate to subrotund, rather abruptly pointed; the lower ones contracted at the base to winged petioles: flowers large, showy, scattered or in loose cymes: calyx tubular, 10–13 lines in length, abrupt at the base, becoming clavate but not obovate in fruit: petals bright scarlet; the blade 8 lines in length, deeply bifid; the lobes more or less toothed: seeds smaller, smoother, and darker colored than in the preceding. — Gen. i. 288; Otth in DC. Prodr. i. 383; Torr. & Gray, Fl. i. 192. *Melandryum rotundifolium*, Rohrb. Monog. Sil. 234, & Linnæa, xxxvi. 257; Wats. Bot. King Exp. 431. — S. Ohio (acc. to Nuttall), Kentucky, and Tennessee, June to August.

S. regia, Sims. (Royal Catchfly.) Viscid-glandular above, finely pulverulent-pubescent below: stems tall, erect, rather rigid, simple or sparingly branched, leafy: leaves ovate, acuminate, 3–7-nerved from the rounded sessile base; the lowest more or less contracted below: flowers showy, in a narrow oblong panicle: calyx cylindrical, 10–12 lines long, becoming somewhat spindle-shaped in fruit: petals spatulate-lanceolate, subentire, scarlet. — Bot. Mag. t. 1724; Sweet's Brit. Fl. Gard. new ser. t. 313; Torr. & Gray, Fl. i. 193. *S. Virginica*, form, Michx. Fl. i. 272. *Melandryum regium*, A. Br. Flora, 1843, 372; Rohrb. Linnæa, xxxvi. 250. — Prairies, Ohio to Alabama and westward to Missouri, not abundant.

+– +– Rocky Mountain and Pacific species.

++ Flowers large, rather few, scattered: calyx cylindrical or clavate in anthesis, 8–12 lines long: corolla (except in *S. Parishii*) usually more than 10 lines in breadth; petals 4–∝-cleft, very rarely bifid: stems leafy.

= Seed-coat more or less roughened but firm.

a. Corolla deep red.

S. laciniata, Cav. Finely pubescent: root narrowly fusiform: stems erect or decumbent, somewhat rigid, knotty below; the branches

ascending: leaves lanceolate to narrowly linear, scabrous, ciliolate, narrowed to a sessile base: flowers terminal on the branches: calyx subcylindric or clavate even in fruit, 10 lines in length: petals bright scarlet, 4-cleft or very rarely bifid: capsule oblong scarcely at all ovate, commonly exserted at maturity. — Icon. vi. 44, t. 564; Lindl. Bot. Reg. xvii. t. 1444; Gray, Pl. Wright. ii. 17; Wats. Proc. Am. Acad. x. 341. *S. pulchra*, Torr. & Gray, Fl. i. 675 in part. *S. speciosa*, Paxt. Mag. of Bot. x. 219. *S. simulans*, Greene, Pitt. i. 63. *Lychnis pulchra*, Cham. & Schlecht. Linnæa, v. 234.— Central California to New Mexico. (Mex.)

Var. Greggii, Wats. Leaves oblong-lanceolate to ovate, otherwise not differing essentially from the type. — Proc. Am. Acad. x. 341, & Bibl. Index, 108. *S. Greggii*, Gray, Pl. Wright. ii. 17. *Melandryum laciniatum*, var. *Greggii*, Rohrb. Monog. Sil. 232. *Melandryum Greggii*, Rohrb. Linnæa, xxxvi. 256. — New Mexico, *Wright, Thurber, Matthews;* Arizona, *Buckminster, Lemmon.* (Mex., *Gregg.*)

S. Californica, Durand. Root simple, strong, penetrating vertically to a depth of 2–3 feet: stems several, procumbent or suberect, leafy: leaves lanceolate or ovate elliptic, more or less narrowed to the base, acuminate, rarely obtusish: corolla more than an inch broad; petals variously cleft, most commonly with two broad lobes flanked by two narrower ones: capsule ovoid, concealed until dehiscence by the rather broad calyx. — Pl. Pratt. 83; Brew. & Wats. Bot. Calif. i. 64. *S. pulchra*, Torr. & Gray, Fl. i. 675 in part. *S. Virginica*, Benth. Pl. Hartw. 299. *S. laciniata*, var. *Californica*, Gray, Proc. Bost. Soc. vii. 146; Wats. Proc. Am. Acad. x. 341. *S. Tilingi*, Regel, Act. Hort. Petrop. i. 99. *Melandryum Californicum*, Rohrb. Linnæa, xxxvi. 252.— Coast Mts. of Currie Co., Oregon (*Howell*), southward through N. and Central California to Ft. Tejon (*Xanthus*), and perhaps farther. Subject to much variation in foliage, the following being perhaps the best marked of the varieties.

Var. subcordata. Leaves ovate, suborbicular, shortly acuminate, closely sessile by subcordate bases. — Blue Cañon, *Kellogg* (1870), *Brandegee* (1888).

b. Corolla white or nearly so.

S. Wrightii, Gray. Very glutinous: rootstock thick, ligneous: stems several, ascending, a foot or more in length, branching, leafy: leaves lanceolate, acuminate, 1½–2 inches long, sessile; the lower attenuate below: calyx teeth filiform-attenuate, nearly half as long as the tube: petals white, 4-cleft; the lobes somewhat toothed: capsule on a stipe of nearly its own length. — Pl. Wright. ii. 17; Wats. Bibl.

Index, 110. *Melandryum Wrightii*, Rohrb. Linnæa, xxxvi. 253; Wats. Bot. King Exp. 431. — Mountain sides near the copper mines, New Mexico, *Wright* (862).

S. Hookeri, Nutt. Covered above with a fine grayish pubescence: root single, stout: stems several, short, slender, decumbent: leaves oblanceolate, rather numerous and approximate, 2–3 inches in length, acute or obtusish: flowers very large: calyx teeth acute, but not filiform: petals 4-cleft, white or pink. — Nutt. in Torr. & Gray, Fl. i. 193; Bot. Mag. t. 6051; Fl. d. Serres, t. 2093; Wats. Proc. Am. Acad. x. 341; Brew. & Wats. l. c. i. 64. *S. Bolanderi*, Gray, Proc. Am. Acad. vii. 330, & viii. 378; Bolander, Cat. 6. *Melandryum Hookeri*, and *M. Bolanderi*, Rohrb. l. c.; Wats. Bot. King Exp. 431. — Woodlands, W. Oregon and N. W. California.

= = Seed-coat vesicularly roughened, or crested.

S. Parishii, Wats. Grayish pubescent: root simple, thick, with a branching rootstock: stems several, decumbent, a span long: leaves lanceolate, acuminate, sessile, 1–2 inches long; the lower oblanceolate: flowers aggregated at the ends of the branches: calyx tubular, narrowed below, an inch long, with narrow subulate teeth 3–4 lines in length: petals narrow, scarcely exserted from the calyx, cleft into 4 or more filiform segments: seeds doubly crested with short vesicular hairs. — Proc. Am. Acad. xvii. 366. — San Bernardino Mts., California, *S. B. & W. F. Parish.*

++ ++ Flowers smaller, not ordinarily exceeding 6–8 lines in diameter.

= Flowers borne in the forks of the branches forming a leafy inflorescence: calyx oblong or campanulate: leaves lanceolate or ovate.

S. campanulata, Wats. Finely glandular-pubescent: root thick, simple: rootstock branching, somewhat woody: stem slender, erect, leafy: leaves sessile, lanceolate: flowers on short deflexed peduncles: calyx green, broadly campanulate, reticulate-veined, toothed nearly to the middle: petals narrow; the limb cleft into 4 or more flesh-colored segments: capsule globular, 3–4 lines in diameter. — Proc. Am. Acad. x. 341; Brew. & Wats. l. c. i. 63. — Mountainous districts of N. California and S. Oregon.

Var. (?) Greenei, Wats. ined. More pubescent throughout: leaves ovate: petals greenish white. — Yreka, Calif., *Greene*; Cañonville and Wolf Creek, Oregon, *Howell Brothers*; Ashland, Oregon, *Henderson*. Apparently the commoner form.

S. Menziesii, Hook. Finely glandular-pubescent: stems weak, leafy, dichotomously branched above, 6 inches to a foot or more in

height: leaves ovate-lanceolate, acuminate at each end, thin: flowers very small: calyx obconical, obovate, or oblong, only 2½–4 lines in length: petals white, 2-cleft, commonly but not always unappendaged: capsule 1½–2 lines in diameter. — Fl. Bor.-Am. i. 90, t. 30; Torr. & Gray, Fl. i. 193 & 676; Rohrb. Monog. Sil. 147. *S. stellarioides*, Nutt. in Torr. & Gray l. c. i. 193. *S. Dorrii*, Kellogg, Proc. Calif. Acad. iii. 44, f. 12. — From Colorado to Vancouver Isl., S. California, and New Mexico.

= = Flowers few, rather small, white or nearly so, nodding, borne in a lax naked panicle: petals cleft into four or more narrowly linear, almost filiform segments: styles long-exserted: leaves small, lanceolate, chiefly clustered upon the more or less cespitose base.

S. longistylis, Engelm. Hoary-pubescent, minutely glandular above: root single: rootstock branched: stems 2–several, slender, 6–12 inches high, bearing 3–6 loosely paniculate or subracemose heads: leaves linear-lanceolate or oblanceolate, acute: calyx soon becoming ovoid: petals with a spatulate very pubescent, scarcely or not at all auriculate claw; the blade divided into 4 linear filiform segments; appendages linear, entire: capsule subsessile: seeds (apparently mature) small, dark red. — Engelm. in herb. Wats. Proc. Am. Acad. xxii. 469. — Scott's Mts., N. California, *Engelmann;* Ashland Butte, S. W. Oregon, *Henderson;* specimens collected in Plumas Co., Cal. (*Mrs. Austin*), and Mariposa Co. (*Congdon*), probably belong here also.

S. Lemmoni, Wats. Similar in habit: leaves broader, lanceolate, quite smooth or somewhat pubescent and glandular: calyx inclined to be herbaceous, especially the lanceolate acutish teeth, but the veins from the different nerves seldom anastomosing with each other: petals with a rather broad villous auriculate claw; the four divisions of the blade linear but not filiform: capsule nearly sessile: seeds red, somewhat irregular in shape, 1 line in length. — Proc. Am. Acad. x. 342; Brew. & Wats. l. c. i. 64. — California, Sierra Co., *Lemmon;* Janesville, *Brandegee;* Mariposa Co., *Congdon;* Coast Mts. north of San Francisco, *Rattan*. This species is too near the preceding and following, and it is not unlikely that more abundant material may show intergradation between them.

S. Palmeri, Wats. Similar in habit, more or less pubescent throughout, finely glandular above: leaves oblanceolate: calyx teeth commonly short and blunt, scarcely herbaceous; the base of the calyx often contracted about the short but distinct stipe of the ovary: the petals purplish; the claw villous, narrowly or broadly spatulate but

not auriculate; the limb deeply 4-cleft; the segments entire or bifid: seeds large for the genus, tuberculate, ash-colored at maturity. — Proc. Am. Acad. xi. 124; Brew. & Wats. l. c. i. 65. — S. California, Cucamaca Mts., *Palmer;* San Bernardino Mts., *Parish;* San Rafael Mts., *Ford.*

= = = Inflorescence as in the preceding: petals 2-cleft into linear segments: styles very long, the exserted portion as long as the calyx.

S. Bridgesii, Rohrb. Pubescent and viscid: stems leafy, usually simple up to the inflorescence, a foot or more in height: leaves sessile, lanceolate, acute, 1½–2 inches long: flowers slender-pedicelled, verticillately racemose or somewhat paniculate, nodding: calyx narrowly oblong or clavate in anthesis, broadly obovate in fruit; the teeth acute; the principal nerves broad, green; the commissural much narrower, seldom anastomosing with the others: petals ½–¾ inch long, considerably exserted, white or purplish: seeds very large, finely tuberculate, red. — App. Ind. Sem. Berol. 1867, 5, & Monog. Sil. 204; Wats. Proc. Am. Acad. x. 342; Brew. & Wats. l. c. i. 66. *S. incompta,* Gray, Proc. Am. Acad. vii. 330 = *S. Engelmanni,* Rohrb. Linnæa, xxxvi. 264, is a form of the same species, differing from the type only in the somewhat broader lobes of the petals and in the obtuse appendages. — Yosemite Valley, *Bridges, Gray;* Mt. Bullion, *Bolander;* Danah, *Congdon.* A closely similar if not identical plant has been found by *Rattan* on the Klamath River in N. California.

= = = = Flowers scattered, or variously paniculate: styles included or somewhat exserted, but not so long as in the preceding.

a. Fruiting calyx ovate, not contracted below, filled and distended by the subsessile capsule.

S. Thurberi, Wats. Densely grayish-pubescent and glandular: stems erect, 2 feet high, somewhat rigid, with ascending branches; leaves lanceolate, acute, contracted below, sessile, 2–4 inches long; flowers small, rather numerous: calyx cylindric becoming narrowly ovate, green-and-white striped, densely pubescent; the teeth slender with fimbriate laciniate margin: petals white, little exceeding the calyx; the claw rather broad with upwardly produced auricles; blade bifid with short oblong lobes, each with a small lateral tooth; appendages oblong, obtuse: capsule narrowly ovoid, scarcely stiped: seeds tuberculate and distinctly crested. — Proc. Am. Acad. x. 343. *S. plicata,* Wats. l. c. xvii. 366. — Near Janos, S. W. New Mexico, *Thurber;* peak south of Rucker Valley, *Lemmon.* (Mexico, *Pringle.*)

S. pectinata, Wats. Stems several, erect, 1½–2½ feet high: leaves lanceolate or oblanceolate, acute or acuminate; the lower long, tapering into winged petioles; the upper more or less reduced: flowers

purplish rose-colored, 6–8 lines broad: calyx becoming ovate in fruit: the teeth lance-linear to filiform, elongated, usually exceeding the mature capsule: petals with a narrow claw destitute of auricles; the blade obovate, bifid; the lobes rounded; the appendages lanceolate, entire: capsule large, ovate. — Proc. Am. Acad. x. 344; Brew. & Wats. Bot. Calif. i. 65. — Plumas Co., Calif., *Mrs. Ames;* Sierra Co., *Lemmon;* Carson City, Nev., *Anderson.* The typical form is very viscid glandular and somewhat branched.

Var. subnuda. Scarcely viscid: stems subsimple: radical leaves almost smooth, the cauline much reduced. — Near Empire City and at Franktown, Nev., *M. E. Jones.*

b. Capsule distinctly stiped: calyx relatively narrow, cylindric or in fruit clavate or obovate and usually rather distinctly contracted about the stipe of the capsule.

1. Petals 4 (–∝)-fid.

S. Oregana, Wats. Finely pubescent and very viscid, fetid: stems 1–several, erect, simple up to the racemiform or rather densely cymose-paniculate inflorescence: the lower leaves oblanceolate, narrowed below to long petioles; the upper leaves lanceolate or lance-linear, sessile: petals white with spatulate claws, glabrous, distinctly auricled at the summit; the blade 2–3 lines long, variously cleft into 4–6 or more linear segments: the stipe of the ovoid capsule about 2 lines long. — Proc. Am. Acad. x. 343; Brew. & Wats. l. c. i. 65. — Mountains of Oregon, Washington, and Montana, April to August.

S. montana, Wats. Finely pubescent: stems erect from a more or less decumbent base, 4–14 inches high: leaves lance-linear or narrowly oblanceolate, acuminate, 1–2½ inches in length; the cauline 3–4 pairs: inflorescence varying from subspicate to paniculate; flowers rarely solitary: calyx 6–9 lines in length: petals greenish white to rose-colored, exserted 2–4 lines: ovary long-stiped: capsule acutish. — Proc. Am. Acad. x. 343. — Near Carson City, Nev., *Anderson;* Sierra Co., Cal., *Lemmon.* *S. Shockleyi*, Wats. l. c. xxv. 127, from the White Mts., Mono Co., Cal., is apparently only a high-mountain form of the same species.

Var. rigidula. Stems simple, a span high, slightly rigid: leaves short, less than an inch in length, thickish and stiff: flowers white, subspicate. — Franktown, Nev., *M. E. Jones*, 1882.

S. occidentalis, Wats. Viscid-glandular, 2 feet high: stems one or two from a single strong root, branched above: leaves lanceolate or oblanceolate, 2–3 inches long: flowers in a very loose open panicle: calyx elongated, cylindric becoming clavate in fruit: petals purple,

4-cleft into lanceolate segments; the blade narrowed gradually into the cuneate claw, the latter devoid of auricles; appendages linear: capsule oblong, upon a stipe 2 lines in length. — Proc. Am. Acad. x. 343; Brew. & Wats. l. c. i. 64. — Calif., *Bolander*, without special locality; Plumas Co., Calif., *Lemmon, Mrs. Austin;* Butte Co., *Mrs. Bidwell.*

2. Petals bifid, each lobe sometimes bearing a very small lateral tooth.

S. purpurata, Greene. "Stems numerous, from slender running rootstocks, 6–18 inches high, rather slender: whole plant pubescent and slightly viscid: leaves rather remote, linear-lanceolate, acute, 1½ inches long: flowers in terminal and subterminal peduncled or subsessile cymes of about 3: calyx purple, rugose-veiny, clavate, not inflated, ½ inch long or more; limb of petals more than half as long, white or pink, obcordate or bifid, appendaged at base." — This species, not seen by the author, appears to be near *S. Scouleri*, Hook. The description is drawn from Pittonia, ii. 229. — Porcupine River, interior of N. Alaska, *J. H. Turner.*

S. verecunda, Wats. Low, 6–12 inches in height, finely pubescent below, glandular-viscid above: stems several, leafy especially near the base: leaves narrowly lanceolate or oblanceolate to linear, acute: flowers rather few, mostly terminal or subterminal; the branches of the inflorescence erect: calyx soon becoming strongly obovate by the development of the broad ovoid capsule: calyx teeth with membranous ciliated margins: petals rose-colored; the claw glabrous, narrowly auricled; the blade 2-cleft into short entire oblong segments; appendages oblong, blunt and somewhat toothed at the apex. — Proc. Am. Acad. x. 344; Brew. & Wats. l. c. i. 65. *S. Engelmanni*, var. *Behrii.* Rohrb. Linnæa, xxxvi. 264. — Central California near the coast, Mission Dolores, San Francisco.

S. Luisana, Wats. Taller, finely pubescent: stems several from a branching caudex, erect, slender, viscid above: leaves narrowly oblanceolate to linear, acute, most numerous at the base; the cauline gradually reduced: flowers borne upon short spreading peduncles: fruiting calyx clavate; teeth long and narrow, with an incurved membranous ciliated margin: petals white, with narrowly auricled glabrous claw, and 2-cleft blade; segments linear-oblong, entire or with a small lateral tooth; appendages lanceolate, often toothed: capsule cylindric. — Proc. Am. Acad. xxiii. 261. — California, San Luis Obispo, *J. G. & S. A. Lemmon;* near Tolon, *Brandegee;* mountains south of Ft. Tejon, *Coville & Funston.*

S. platyota, Wats. Minutely pubescent throughout, glandular above: root thick: stems slender, 1½ feet high: leaves oblanceolate,

acute, narrowed below to winged ciliated petioles: inflorescence branched; flowers borne singly, or in the stronger individuals somewhat fascicled at the ends of the branches: calyx clavate in fruit, with broad green nerves; teeth acutish with membranous ciliated margins: mature capsule short, oblong, not exceeding 2 lines in diameter: the petals greenish white or roseate; claws villous toward the base, with broad entire or toothed auricles above; the blade bifid; the short oblong lobes with or without small lateral teeth; appendages lance-oblong. — Proc. Am. Acad. xvii. 366. — S. California, Cuyamaca Mts., *Palmer, Cleveland;* San Bernardino Mts., *Lemmon, Parish Bros., Wright.* San Jacinto Mts., *Parish Bros.* (Lower Calif.) A very dwarf specimen apparently of this species from San Bernardino Mts., 11,000 ft. (*W. G. Wright*), has purplish petals and a calyx with blunter teeth and less prominent veins.

S. Sargentii, Wats. Cespitose, minutely pubescent: stems numerous, slender, erect, 6 inches high: leaves linear or nearly so, 1 to nearly 2 inches long, a line or so in breadth; the radical crowded, covering the rootstock with their slightly enlarged and imbricated bases; the cauline 2–3 pairs: calyx cylindrical, 7 lines long; teeth short: the petals white or pink; the claws exserted, with broad laciniately cleft auricles; the blade short, obovate, bifid; the segments each bearing a small lateral tooth: capsule well stiped, cylindrical, and very slender, at maturity scarcely more than a line in diameter: seeds tuberculate-crested, smooth on the faces. — Proc. Am. Acad. xiv. 290. — Table Mountain, Monitor Range, N. Nevada, *C. S. Sargent.*

c. Calyx broader, oblong, campanulate or rarely obovate, rather loosely surrounding the ovary, sometimes narrowed downward but not distinctly contracted about the carpophore.

1. Petals divided into 4 nearly equal segments: appendages fringe-toothed.

S. Bernardina, Wats. Covered with a fine grayish pubescence below, finely glandular above: caudex branching: stems several, slender, erect, 8–12 inches high, furrowed, 1–5-flowered: leaves grass-like, narrowly linear, 1-nerved, acute: terminal flower developing first, the lower ones borne upon branches 1½–2 inches long: buds acute: calyx green-nerved; the teeth lanceolate acutish, with membranous ciliated margin: petals white with rather short blade; the claw with broad laciniate auricles; appendages 4, long; the inner ones broad and toothed: capsule moderately stiped. — Proc. Am. Acad. xxiv. 82. — On shady slopes, Long Meadow, Tulare Co., Calif., *Palmer.*

2. Petals bifid; each segment with or without a smaller lateral tooth.

1* Low, 3–8 inches in height.

S. Grayii, Wats. — Cespitose, minutely pubescent and glandular: rootstock elongated, much branched: stem simple, erect, 4–6 inches high, 1–5-flowered; leaves short, oblanceolate or spatulate, slightly fleshy, 4–8 lines in length, the radical numerous, crowded; the cauline about 3 pairs: calyx broadly cylindrical: the teeth rounded; petals pink, with blade deeply bifid, and segments each bearing a lateral tooth; claw narrowly auricled: capsule short ovoid, scarcely stiped. — Proc. Am. Acad. xiv. 291; Robinson, Bot. Gaz. xvi. 44, t. 6. — Mt. Shasta above the timber line and near snow, *Brewer*, *Hooker & Gray*, *Packard*, *Pringle*. Specimens collected on Mt. Rainier by *E. C. Smith*, and having somewhat longer leaves, may be doubtfully referred to this species.

S. Watsoni. Finely glandular above, minutely pubescent, nearly smooth below: stems many, cespitose from a multicipital caudex, erect, very slender, simple, 4–8 inches in height, bearing 1–3 (rarely 5) flowers: leaves linear or very narrowly oblanceolate, acute, dark green; the radical numerous, an inch in length, seldom exceeding a line in breadth: the slender petioles expanding at the base, closely imbricated and connate by scarious membranes: calyx ovate or somewhat obovate, 5–6 lines in length, with purple more or less anastomosing nerves; the teeth with membranous margins: petals white or rose-colored: the blade short, a line in length, bifid; each segment usually bearing a short lateral tooth; appendages obtuse: styles ordinarily 3, rarely 4. — *Lychnis Californica*, Wats. Proc. Am. Acad. xii. 248. — California, near Ebbett's Pass, *Brewer*; Mt. Dana, *Bolander*; Sierra and Plumas Cos., *Lemmon*. As in *S. Lyallii*, the anthers are often infested by *Ustilago antherarum*, and in consequence enlarge and turn purple.

S. Suksdorfii, Robinson. Low, densely matted, alpine: stems 2–3 (rarely 4–5) inches high, simple 1–3-flowered, minutely pubescent below, glandular above: stem leaves about 2 pairs, linear, 3–7 lines long, a line wide; radical leaves numerous, crowded, similar or somewhat spatulate: calyx broadly cylindric or campanulate, seldom exceeding 5 lines in length; nerves conspicuous, simple below, anastomosing above: petals white, little exceeding the calyx, shallowly bifid; lobes entire; appendages oblong, retuse: stipe of capsule $1\frac{1}{2}$ lines long. — Bot. Gaz. xvi. 44, t. 6. — California to Washington, Mt. Stanford, *Hooker & Gray*; Mt. Paddo, *Suksdorf*; Mt. Hood *Howell*; Mt. Stewart, *Brandegee*; Mt. Rainier, *Piper*.

2* Taller.

S. Lyallii, Wats. Very finely puberulent or quite smooth: stems numerous from a much branched matted base, leafy: leaves thin, narrowly oblanceolate, acute, only 1–1¾ inches long, 2 lines broad: inflorescence considerably branched in the type: calyx varying with age from subturbinate to inflated campanulate, 4 lines long: petals dark purple, bifid with subentire lobes: anthers large, purple. — Proc. Am. Acad. x. 342. — Cascade Mts., Lat. 49°, *Lyall;* Sierra Co., Cal., *Lemmon;* Summit Camp, Cal., *Kellogg*. This doubtful species is to be distinguished from some forms of *S. Douglasii* only by its smaller flowers, more leafy habit, and darker petals. All the specimens at hand, including the type, are diseased and apparently sterile, the ovaries remaining undeveloped, and the anthers having been attacked by a fungus (*Ustilago antherarum*), to which their large size and dark color are probably due.

S. Douglasii, Hook. Finely pubescent, scarcely viscid: stems very slender, usually decumbent and geniculate at the base: leaves remote, long, linear to narrowly lance-linear, attenuate to each end, spreading, 2–3 lines long, 1–2 lines wide: flowers borne mostly in 3-flowered, long-peduncled cymes; calyx oblong or obovate, rather narrow at the base; the ends of the teeth surrounded by an ovate obtuse inflexed membrane: petals white or pink, 2-lobed; segments obtuse; claw moderately auricled; appendages oblong, obtuse: capsule narrowly cylindrical, 5 lines long; teeth recurved; stipe 1½ lines long. — Fl. Bor.-Am. i. 88; Torr. & Gray, Fl. i. 190; Wats. Bot. King Exp. 36, 431, & Proc. Am. Acad. x. 341; Brew. & Wats. Bot. Calif. i. 66. *Cucubalus Douglasii*, Eat. Man., ed. 7, 266. — Wahsatch Mts., Utah to Central California, northward to Montana and Brit. Columbia; June to September. A common and polymorphous species, of which the following are the chief varieties; all of them tending to intergrade with the type, and separated from it and each other by no constant or important floral character.

Var. multicaulis. Grayish-tomentulose and less glandular: the leaves more approximate, narrowly lanceolate or oblong, taper-pointed, erect: stems more rigid. — *S. multicaulis*, Nutt. in Torr. & Gray, Fl. i. 192. *S. Drummondii*, var. Torr. & Gray, Fl. i. 675. — "Oregon," *Nuttall;* Washington, Yakima Co., *Brandegee* (655 in part); Klickitat, *Howell;* Spokane Co., *Suksdorf, Ramm;* N. Idaho, *Spalding, Sandberg* (342); Montana, *Scribner, Canby*.

Var. Macounii. Minutely pubescent, somewhat glandular above: leaves distant, long and narrow, short-pointed, tapering very gradually

from near the apex to the base: calyx oblong, rather short, 4–5 lines in length, narrow, teeth purple-tipped: styles in specimens studied 3–4, very rarely 5. — *S. multicaulis*, Macoun, Cat. Canad. Pl. 494. *S. Macounii*, Wats. Proc. Am. Acad. xxvi. 124; Macoun, Bot. Gaz. xvi. 286. — Washington, *Lyall*, *Brandegee* (655 in part); British Columbia, summits of Rocky and Selkirk Mts., *Macoun*, *Dawson*.

Var. macrocalyx. Tall, puberulent or nearly smooth: leaves narrowly lanceolate or linear, attenuate both ways: calyx long, cylindrical, 7–8 lines in length. — Humboldt Mts., W. Nevada, *Watson*; Mt. Adams, Washington, *Suksdorf*, *Howell*.

Var. viscida. Glandular viscid, especially above: stems erect, rigid, mostly simple from a branched slightly woody base: calyx broadly oblong or almost campanulate, relatively short: leaves narrowly lanceolate to linear-oblong, thickish. — British Columbia, at Kicking Horse Pass, *Macoun*; Washington, Yakima Region, *Brandegee*; Olympic Mts., *Piper*.

Var. brachycalyx. Puberulent, not viscid; leaves distant, spreading, narrowly oblanceolate, attenuate: calyx short and broad, campanulate. — Oregon, Multnomah Co., 1877, *Howell*; also by same collector on Sauvie's Island, 1880.

Var. monantha. Nearly or quite smooth: stems very slender and weak, rising from a spreading much branched base: leaves thin, lanceolate or linear-oblong, and grass-like, narrowed both ways: flowers solitary, terminal, or 3–5 loosely cymose: calyx oblong-campanulate, inflated. — *S. monantha*, Wats. Proc. Am. Acad. x. 340; Brew. & Wats. l. c. i. 63. — Cascade Mts., Washington, *Harford & Dunn*; Webber Lake, Cal., *Lemmon*; N. Utah (?), *C. C. Parry*.

S. scaposa. Finely puberulent, somewhat viscid above: stem erect, subsimple, almost naked, 1–1½ feet high, rather rigid: radical leaves thickish, oblanceolate, acute, 3-nerved, somewhat glaucous, 2–3 inches in length, 3–5 lines broad; cauline leaves reduced to 1 or 2 pairs of distant bracts: inflorescence a narrow rigid panicle: flowers small, erect: calyx oblong or elliptic in outline, with simple green nerves: petals white, scarcely exceeding the calyx; the blade short, retuse; the claw with somewhat saccate auricles; appendages short obtuse: ovary shortly stiped. — Oregon, Blue Mts., *R. D. Nevius*, 1874; Cold Camp (355) and Currant Creek, *Thos. Howell*, 1885, May.

= = = = = Inflorescence denser, subspicate, or forming an elongated thyrse: styles included or moderately exserted.

S. Hallii, Wats. Stems several, from a stout root, simple, densely glandular-pubescent. 6 inches to 1½ feet high: leaves oblanceolate,

acute, tapering to the base, the midrib prominent below: flowers verticillately spicate, nodding: calyx even in anthesis broad, oblong or campanulate becoming obovate, strongly marked with purple or green nerves; those at the commissures irregularly anastomosing with the others and frequently double; the teeth triangular, acute, with membranous incurved margins: petals purple, not greatly exceeding the calyx; the claw very broad, laterally ciliate; the blade short, bifid; segments somewhat oblique, often toothed: capsule ovate on a short stipe. — Proc. Am. Acad. xxi. 446. *S. Scouleri* of various authors, not of Hooker; thus Gray, Am. Journ. of Sci. ser. 2, xxxiii. 405, & Proc. Philad. Acad. 1863, 58; Porter & Coulter, Fl. of Col. 12; Wats. l. c. x. 342 in part; Coulter, Man. of Rocky Mountain Bot. 32 in part. — Alpine regions of Colorado, *Hall & Harbour*, *Greene*, *French*, *Brandegee*, *Patterson*; a doubtful specimen from Arizona, *Knowlton*. August and September.

S. Scouleri, Hook. Pubescent, glandular-viscid above: root stout: stems simple, $1\frac{1}{4}$–$2\frac{1}{2}$ feet high: leaves narrowly oblanceolate or lance-linear, acuminate, not at all warty: inflorescence 6–8 inches long, verticillately spicate, or the lower flowers borne upon short appressed cymes: calyx clavate; nerves definite, but anastomosing above; teeth short with a broad membranous margin, ciliate: petals white or purplish; the claw with rather narrow, slightly laciniate auricles; the blade bifid; segments emarginate or toothed; appendages blunt: stipe of capsule 2 lines long. — Fl. Bor.-Am. i. 88; Torr. & Gray, Fl. i. 191; Rohrb. Monog. Sil. 213. *S. Drummondii*, Gray, Proc. Am. Acad. viii. 377. *Elisanthe Scouleri*, Ruprecht, Fl. Cauc. i. 200. — Frequent in mountainous districts of Oregon and Idaho to Vancouver Isl. and "Northwest Coast," *Menzies*; Colorado, *Brandegee*. July and August.

S. Pringlei, Wats. Habit, inflorescence, and calyx of the last: leaves very long, usually narrow and attenuate, both surfaces roughened, especially in the older leaves, with fine warts: petals purplish, bifid; segments each bearing a lateral tooth; auricles rather broad; appendages saccate: capsule ovate-oblong, well stiped. — Proc. Am. Acad. xxiii. 269. — Mt. Graham, Arizona, *Rothrock*; New Mexico, *Greene*. (Chihuahua, *Pringle*.)

S. Spaldingii, Wats. Viscid-tomentose: stems several, knotty, a foot high, very leafy: branches appressed or ascending: leaves lanceolate, sessile, $1\frac{1}{2}$–2 inches long: flowers subspicate or appressed cymose-paniculate: calyx in fruit obconical, more herbaceous than usual in the genus, net-veined nearly to the base; teeth rather large, triangular-lanceolate, acutish: the petals greenish white, not exceeding

the calyx; the claw broadly auricled; the blade bifid, very short indeed, scarcely surpassing the four small appendages: capsule ovate-oblong, moderately stiped. — Proc. Am. Acad. x. 344. — On the Clear Water, Central Idaho, *Spalding;* on the Lumnaha, Union Co., Oregon, *Cusick.* September.

6. LYCHNIS, Tourn. Cockle. (Name ancient, from λύχνος, a lamp, in reference to the bright color of certain European species.) — Herbs, chiefly of Europe and Asia, much resembling various species of *Silene,* and sometimes distinguished only by the number of the carpels. — The latter being in a few cases variable, the separation of the two genera is rather arbitrary. The indigenous species are Western or Arctic (*L. alpina* extends eastward and southward to Lower Canada), but several introduced European species have become more or less common in the Atlantic and Middle States, and in Canada. — Inst. i. 333, t. 175; DC. Prodr. i. 385; Torr. & Gray, Fl. i. 194; Endl. Gen. 972–974; A. Braun, Flora, 1843, 369; Reichb. Icon. Fl. Germ. vi. t. 303–308; Benth. & Hook. Gen. i. 147; Wats. Proc. Am. Acad. xii. 246; Baill. Hist. des Pl. ix. 108; Pax in Engl. & Prantl, Nat. Pflanzenfam. iii. 1 b. 72.

§ 1. Teeth of the usually more or less inflated calyx not twisted: ovary unicellular at the base: capsule with its five valves normally bifid, but sometimes indistinctly so or entire. (Melandrium, Röhl., Deutschl. Fl. 254, and Eulychnis, Fenzl in Endl. l. c. 974. The separation of these sections in the American species is not practicable, as the inflation of the calyx and toothing of the capsule are not sufficiently definite or constant characters.)

* Native species, Western or Arctic: leaves narrowly lanceolate, spatulate or linear; the radical usually numerous and the cauline few.

† Tall: stems erect, usually a foot or more in height, several to many flowered: species ranging from Winnipeg to the Sierras, but chiefly of the Rocky Mountains, though not truly alpine.

= Capsule sessile: petals included or scarcely exserted.

L. Drummondii, Wats. Finely grayish-pubescent throughout, often purple-glandular above: stems erect, simple, somewhat rigid: leaves narrow; the lower oblanceolate; the upper lance-linear: flowers on long usually appressed pedicels: calyx in the typical form oblong-cylindric or scarcely ovate, with green nerves: petals small, white or purplish, with the short bifid minutely appendaged blade narrower than the claw: seeds uniformly tubercled, not distinctly crested. — Bot. King Exp. 37, 432, & Proc. Am. Acad. xii. 248. *L. apetala,* Gray, Am. Journ. Sci. ser. 2, xxxiii. 405 in part. *L. apetala,* var.

pauciflora, Porter in Hayden, Rep. 1870, 473. *Silene Drummondii*, Hook. Fl. Bor.-Am. i. 89; Torr. & Gray, Fl. i. 191 in part; Rohrb. Monog. Sil. i. 83. *Elisanthe Drummondii*, Rupr. Fl. Cauc. i. 200. — Fort Vancouver to Winnipeg valley and southward along the Rocky Mts. to N. Mexico and Arizona; flowering through the summer; very variable, especially in pubescence. A lanate form has been found by Bourgeau in the Winnipeg valley; a form distinguished by its broader thinnish leaves, purple glandular pubescence, and more distinctly ovate calyx, has been collected in the Uintas, *Watson*, and at Gray's Peak, *Hooker & Gray*, *Patterson*.

= = Capsule more or less distinctly stiped: petals conspicuously exserted.

L. elata, Wats. Finely grayish-pubescent: stems erect, simple: leaves lanceolate or linear-oblong; the radical spatulate, 3–4 inches in length: flowers nodding on short spreading pedicels: calyx membranaceous, inflated, oblong, with rather short triangular teeth: petals purplish, exserted 4-5 lines from the calyx-tube; the blade bifid, each segment bearing a short narrow lateral tooth; the claw distinctly and rather broadly auricled: stipe of the capsule over a line in length. — Proc. Am. Acad. xii. 249. *Silene Scouleri*, Gray, Am. Journ. Sci. ser. 2, xxxiii. 405. — Rocky Mts., British America, *Bourgeau*; Colorado, *Parry*, *Miss Eastwood*, *Letterman*. This species much resembles *Silene Hallii*, except in the number of styles. Careful observations upon the constancy or variability of this character are greatly to be desired.

L. Parryi, Wats. Viscid-glandular: stems several, nearly naked, scarcely a foot in height: leaves linear, 1–2 inches in length: flowers erect or nodding on rather short pedicels: calyx oblong or obovate, inflated, purple-nerved: petals exserted 2–3 lines, the blade short, bifid, and with lateral teeth; the claw as in the preceding; appendages broad and blunt; stipe of the capsule about a line in length. — Proc. Am. Acad. xii. 248. — Northwestern Wyoming, *Parry*. Styles sometimes 4.

L. nuda, Wats. Finely pubescent, slightly viscid: stems erect, slender, bearing but 2–3 rather remote pairs of short linear leaves: radical leaves oblanceolate, acute, attenuated below to long slender petioles: flowers few, the lower on branches 2–3 inches long: calyx somewhat firmer than in the two preceding, not at all inflated, at first rather narrowly oblong, becoming obovate in fruit: petals white or rose-colored, 7–8 lines long; the blade bifid; the segments again 2-cleft; the claw broadly auricled, less attenuate to the base than in the

preceding: capsule ovate, 5-toothed, very shortly stiped. — Bot. King Exp. 37, & Proc. Am. Acad. xii. 248. — E. Humboldt Mts., Nevada, 9,000 ft., *Watson.*

+– +– **Alpine or far Northern species.**

+– Calyx ovate, not strongly inflated: flowers on each stem 3 or 5 densely aggregated, rarely solitary: petals exserted: seeds tuberculate.

L. triflora, R. Br. Viscid-tomentose: stems 3–8 inches high: leaves thickish, linear-oblong, often conspicuously ciliate: flowers short-pedicelled: calyx with 10 broad indistinct purple or green nerves: petals white or roseate; the blade obcordate; the claw scarcely auricled. — Ross Voy. App. cxlii., name only; Sommerfelt, Mag. Naturv. ii. (1824), 151, 152; Wats. l. c. 247. *L. apetela*, var. *pauciflora*, Dur. Pl. Kane, 189. *Agrostemma triflora*, Don, Syst. i. 417. *Melandrium triflorum*, Liebm. Fl. Dan. xiv. t. 2356; Rohrb. Linnæa, xxxvi. 231. *Wahlbergella triflora*, Fries, Summa Scand. 155. — Greenland, from Polaris Bay (*Bessel*) southward; Grinnell Land, *Greely.*

Var. Dawsoni. Calyx with principal nerves double or triple, joined by interlacing veinlets; the intermediate nerves beneath the sinuses inconspicuous or wanting: petals very narrow; the blade oblong, bifid, hardly to be distinguished from the narrow claw. — Gravel banks, N. British Columbia, 100 miles northeast of Dease Lake, *Dr. G. M. Dawson.*

+– +– Calyx ovate, scarcely inflated: flowers erect or slightly nodding in anthesis: stems usually 1-flowered, occasionally loosely several-flowered.

= Rocky Mountain and Western alpine species.

L. Kingii, Wats. Densely covered with a very short pubescence, somewhat glandular above: stems slender, erect, 4–6 inches high, 1–2-flowered: leaves narrowly linear: the blade of the petals rather short and broad, emarginate; the claw with broad ciliated auricles; appendages oblong: filaments pubescent. — Proc. Am. Acad. xii. 247, exclusive of Wyoming plant. *L. Ajanensis?* Wats. Bot. King Exp. 37. — Peaks of the Uintas, N. Utah, *Watson.* Additional material of this little known species may perhaps show it to be merely a Southern form of *L. affinis.*

L. montana, Wats. Glandular-pubescent: root thickish, subsimple: stems erect, 2–4 inches high: leaves linear, 1–1½ inches in length: calyx green- or rarely purple-nerved, 5–6 lines long; the teeth short, scarcely acute: petals narrow, about equalling or a line or two exceeding the calyx; the blade small, bifid; the claw narrow, ½–¾ lines in breadth; appendages small or absent: filaments naked. capsule sessile or nearly so. — Proc. Am. Acad. xii. 247. excl. of

specimens from the Uintas. *L. apetala*, Gray, Am. Journ. Sci. ser. 2, xxxviii. 405, & Proc. Acad. Philad. 1863, 58 in part. *L. Kingii*, var. with naked filaments, Wats. l. c. 247. — Mountains of Colorado, *Parry, Hall & Harbour, Scovill, Wolf;* N. W. Wyoming, *Parry.*

= = Arctic or sub-arctic species, or at least of the far North.

L. affinis, Vahl. Glandular-pubescent, 3–6 inches high: leaves oblanceolate-linear, ¾–3 inches in length: calyx ovate-elliptic, usually contracted at the mouth: petals white or pink; the blade narrow, entire or retuse, narrowed from near the end to the summit of the more or less distinctly auricled claw; appendages oblong. — Vahl in Fries, Mant. iii. 36 (1842). *L. triflora*, Hornem. Fl. Dan. xiii. t. 2173. *L. apetala*, Hook. f. Arct. Pl. 321 in part. *Melandrium affine*, Vahl in Liebm. Fl. Dan. xiv. 5, obs. *Wahlbergella affinis*, Fries, Summa Scand. 155. *Melandryum involucratum*, var. *affine*, Rohrb. Linnæa, xxxvi. 217. — Greenland to N. Alaska, *McLenegan*, and according to Rohrb. l. c. southward to Labrador. Warming in Vidensk. Selsk. Forhand. 1886, 129, states that in Norway the flowers are of two kinds, perfect and pistillate, and that the petals in the latter are devoid of appendages and auricles.

L. Tayloræ. Very slender, 1–1½ feet high, puberulent, nearly smooth below, glandular above: stem erect, bearing 3–4 pairs of leaves and two or three long slender almost filiform 1–3-flowered branches: leaves thin, lance-linear, acute or attenuate both ways, finely ciliate, and pubescent upon the single nerve beneath, otherwise glabrate, 2–2½ inches in length: flowers terminal or subterminal on the branches: calyx ovate, not much inflated, about 4 lines long, in anthesis but 2 lines in diameter, with green nerves interlacing above; the teeth obtuse, with broad green membranous ciliate margins: petals 1½ times the length of the calyx; the blade obcordate, 1¼ lines long, considerably broader than the slender narrowly auricled claw; appendages lance-oblong. — Peel's River, Mackenzie River delta, *Miss E. Taylor*, July, 1892. A fragmentary specimen collected on the Kowak River, N. Alaska, by *McLenegan*, may be doubtfully referred to this species.

↔ ↔ ↔ Calyx large, much inflated, almost globose: flowers commonly pendulous in anthesis: seeds margined: stems one-flowered except in var. *elatior*.

L. apetala, L. More or less viscid-pubescent: stems 2–6 inches high: flowers perfect or pistillate, at first pendulous, but becoming erect in fruit: petals in the typical form included; the blade short, bifid; the segments rather irregular, sometimes with a small lateral lobe; the claw auricled. — Spec. 437. *L. frigida*, Schrank, Pflanz.

Lab. 25. *L. montana*, Wats. Proc. Am. Acad. xii. 247 (so far as the Utah specimens are concerned). *Agrostemma apetala*, Don, l. c. i. 416. *Melandryum apetalum*, Fenzl in Ledeb. Fl. Ross. i. 326; Warming, Bot. Foren. Festskr. 1890, 251, f. 25, 26. *Wahlbergella apetala*, Fries, l. c. 155. — A polymorphous species, the forms of which have been elaborated by Regel in Radde's Reisen in Ost-Sib. i. 325–329. N. Greenland and Grinnell Land to Alaska and southward along the Rocky Mountains to Montana, *Canby*, and Uintas, N. Utah, *Watson*.

Var. glabra, Regel. Glabrous throughout, otherwise as in the type. — Regel, l. c. 325 & 327. — Rocky Mts. of Brit. Amer., *Bourgeau;* St. Paul's Isl., Alaska, *Elliott;* Schmagin Isl., *Harrington*. The Alaskan form differs from Bourgeau's plant, upon which the variety was founded, in having much larger thinner leaves.

Var. elatior, Regel (extended). Pubescent, taller, 6–12 inches in height: stems commonly several-flowered: petals sometimes considerably exserted. — Regel, l. c. 328, including var. *macropetala*, so far as the American specimens are concerned. — Kodiak Isl. and northward in Alaska to Kotzebue Sound, acc. to Regel.

* * European species, adventive in the Eastern and Middle States and in Canada: corolla much exserted.

+ Leaves usually large, cauline, lanceolate or ovate-lanceolate: flowers mostly diœcious: valves of the capsule distinctly 2-toothed.

L. diurna, Sibth. (Red Lychnis. Red Campion.) Calyx oblong, rather short, 4–6 lines long, reddish; the teeth triangular-lanceolate, acute: corolla red or pink (rarely white), expanding in the morning: capsule large, globose, with a wide mouth; the teeth recurved. — Fl. Oxon. 145; Reichb. l. c. vi. t. 304. *L. dioica*, var. *α*, Linn. Spec. 437 in part, and var. *a, rubra*, Weigel, Fl. Pom.-Rug. 85. *Melandrium silvestre*, Röhl. Deutschl. Fl. ed. 2, ii. 274. *M. rubrum*, Garcke, Fl. Deutschl. ed. 4, 55. — Not infrequent in Atlantic States.

L. alba, Mill. (Evening Lychnis. White Campion.) Calyx green, longer than in the preceding; the teeth lance-linear, attenuate: corolla more commonly white, opening in the evening: capsule ovate-conical; the teeth erect or slightly spreading. — Dict. ed. 8 (1768). *L. dioica*, var. *β*, Linn. Spec. 437. *L. vespertina*, Sibth. Fl. Oxon. 146 (1794). *Melandryum album*, Garcke, l. c. 55. — Ballast and waste lands, sometimes by roadsides and in cultivated fields, chiefly eastward.

+ + Leaves narrower: flowers perfect: valves of the capsule 5, entire.

L. Flos-cuculi, L. (Ragged Robin.) A slender smoothish perennial, with a furrowed, sometimes minutely roughened stem, $1\frac{1}{2}$–2 feet high: lower leaves oblanceolate; the upper lance-linear: calyx

oblong-ovate, equally 10-ribbed: flowers cymose-paniculate: petals pink or red, cleft to below the middle into 4 linear acute segments. — Spec. 436. *Coronaria Flos-cuculi*, A. Br. Flora, 1843, 368. — Moist fields, New Brunswick, New England, and New York.

§ 2. VISCARIA, Röhl. (as genus). Calyx not inflated; the teeth not twisted: ovary septate at the base: the teeth of the capsule as many as the styles. — Deutschl. Fl. ed. 2, ii. 37; Endl. Gen. 973.

L. alpina, L. Smooth, biennial or perennial, erect, 2 inches to a foot in height: leaves numerous, clustered at the base, linear or oblong, thickish; the cauline 2–4 pairs, erect or ascending: flowers small, the densely clustered cymes forming a terminal head: bracts conspicuous, membranaceous, tipped with red: calyx short-campanulate or turbinate, membranaceous, scarcely nerved; the teeth bright red: petals pink, bifid; segments linear. — Spec. 436; Torr. & Gray, Fl. i. 194; Reichb. Icon. Fl. Germ. vi. t. 307; Wats. l. c. 246. *Lychnis Suecica*, Lodd. Cab. 881. — Greenland to Labrador, and Mt. Albert, Quebec, *Allen*, *Macoun*. (Europe.)

§ 3. AGROSTEMMA, Fenzl. (CORONARIA § PSEUDAGROSTEMMA, A. Br.) Calyx teeth filiform, twisted: flowers few, large: petals with conspicuous awl-shaped appendages: teeth of the capsule as many as the styles: plant woolly. — Endl. Gen. 974.

L. CORONARIA, Desrousseaux. (MULLEIN PINK.) Covered with dense white wool throughout: stem 1½–3 feet high: leaves oval or oblong: calyx ovoid; the alternating ribs more prominent; the teeth small, much shorter than the tube: petals large, crimson. — Desr. in Lam. Dict. iii. 643. *Agrostemma Coronaria*, L. Spec. 436. *Coronaria tomentosa*, A. Br. Flora, 1843, 368. — A handsome plant, tending to escape from cultivation in several localities in New England and the Middle States. (Europe.)

7. AGROSTEMMA, L. CORN COCKLE. (Name from ἀγρός, field, and στέμμα, crown.) — A genus of two species, both natives of the Mediterranean region; one of them, growing in cultivated fields, now cosmopolitan, having been widely disseminated in grain seed. — Gen. n. 379; Pax, l. c. 70. *Githago*, Desf. Cat. Hort. Par. 266; Baill. Hist. des Pl. ix. 108. *Lychnis* § *Githago*, DC. Prodr. i. 387; Benth. & Hook. Gen. i. 148. — Although often united with *Lychnis*, these species through the different relative position of the carpels and petals seem to deserve rank as a separate genus, especially if *Sagina* is to be kept distinct from *Arenaria* upon the same ground.

A. GITHAGO, L. Annual or biennial, covered with a long, silky, appressed or spreading pubescence: stem 1½–3 feet high, somewhat

branched: flowers few, long-peduncled: leaves linear, acute, 2–4 inches in length: corolla 1–1½ inches in diameter; petals obovate, dark purplish red, somewhat lighter toward the claw, and with small black spots: calyx teeth usually an inch or more in length. — Spec. 435. *Lychnis Githago*, Scop. Fl. Carn. ed. 2, i. 310. *Githago segetum*, Desf. l. c. 266.

15. DRYMARIA, Willd. (Name from δρυμός, an oak copse; some species having been supposed to prefer that habitat.) — A group of low diffusely branched plants, chiefly of the New World; our species being weak annuals. — Willd. in Rœm. & Sch. Syst. v. p. xxxi; HBK. Nov. Gen. et Sp. vi. 21, t. 515, 516; DC. Prodr. i. 395; Wats. Bibl. Index, 102, & Proc. Am. Acad. xvii. 327–329.

* Cauline leaves rather broadly ovate.

D. Fendleri, Wats. An erect annual, 2–10 inches high: stems, peduncles, and petioles finely glandular-pubescent: leaves membranaceous, reniform-ovate, subcordate, abruptly acuminate, nearly smooth, 4–5 lines long, on slender petioles half their length: flowers aggregated in terminal fascicles, or single in the forks; sepals herbaceous, lanceolate, acuminate, 1–3-nerved. — Proc. Am. Acad. xvii. 328. *D. cordata*, Gray, Pl. Fendl. 13. *D. glandulosa*, Gray, Pl. Wright. ii. 18; Torr. Pacif. R. Rep. iv. 70, & Bot. Mex. Bound. 37. — New Mexico and Arizona.

D. holosteoides, Benth. Prostrate, smooth and somewhat glaucous: stems numerous, each bearing 2–3 remote fascicles of leaves and flowers: leaves appearing quaternate, ovate, obtuse, thickish, 3–5-nerved, 3–6 lines long, rather abruptly contracted into a slender petiole 2–3 lines in length: pedicels equalling or slightly exceeding the petioles, 1–flowered: sepals obtusish, 1¾ lines long, with conspicuous membranous margins: seeds black, hooked, or somewhat cocleate. — Bot. Sulph. 16; Wats. Bibl. Index, 103. — Dry bed of Tarlinga Creek, W. Texas, *Havard.* (Lower Calif.)

* * Cauline leaves linear, pseudoverticillate.

D. sperguloides, Gray. Covered with a fine grayish pubescence or quite glabrous: radical leaves spatulate, fugacious: stem erect, with spreading branches and pseudoverticels of 4–8 sessile narrow obtuse slightly fleshy leaves 5–10 lines long, ½ line in breadth: inflorescence diffuse; flowers pedicellate. — Pl. Fendl. 11, & Pl. Wright. ii. 19; Torr. Bot. Mex. Bound. 37. — Cornfields, etc., Texas, near Presidio del Norte, *Parry;* New Mexico, *Fendler*, *Wright;* Arizona, *Palmer*, *Lemmon.*

* * * Cauline leaves linear, opposite: stems erect, delicate, much branched flowers short-pedicelled in the forks of a diffuse inflorescence.

D. effusa, GRAY. Viscid, especially upon the upper part of each internode: radical leaves obovate, seldom persisting; cauline very narrowly linear, obtuse: sepals elliptic, obtuse, or scarcely acute, not distinctly ribbed, considerably exceeded by the petals. — Pl. Wright. ii. 19; Torr. Bot. Mex. Bound. 37. — Mountainous districts, New Mexico, *Wright;* Arizona, *Rothrock, Lemmon.* (Adjacent Mexico, *Thurber.*)

D. tenella, GRAY. In size and habit closely resembling the preceding, but glabrous and not viscid: sepals acutish, rather strongly ribbed, a line in length, about equalling the petals. — Pl. Fendl. 12, & Pl. Wright. ii. 19. — Shady places, woodland, New Mexico, *Fendler, Wright, Greene.* (Adjacent Mexico, *Pringle.*) D. NODOSA, Engelm., of Mexico, is a third closely related species, but has glandular stems, and somewhat larger flowers with attenuate rather rigid sepals 1½–2 lines long.

16. POLYCARPON, Lœfling (*πολύς*, much, many, and *καρπός*, fruit, from the innumerable capsules.) — A small genus of low, much-branched annuals. Flowers numerous, cymose, very small. — Genus ascribed to Lœfling in Linn. Gen. ed. 6, n. 105; DC. Prodr. iii. 376; Torr. & Gray, Fl. i. 173.

P. TETRAPHYLLUM, L. Nearly or quite smooth: stems 2–6 inches long, prostrate, or ascending: leaves quaternate or opposite, oblong or obovate, obtuse, 2½–6 lines long, abruptly narrowed to short petioles: stipules and bracts scarious, acuminate, the latter equalling the rather sharply acuminate sepals: petals white. — Spec. ed. 2, 131; Eng. Bot. t. 1031; Ell. Sk. i. 182. — Introduced in S. Carolina near Charleston and at Camden, *Curtis.* (Old World.)

P. depressum, NUTT. Smaller: stems numerous, 1–2 inches long: leaves opposite, spatulate, obtuse, attenuate to slender petioles: bracts much shorter than the scarcely carinate sepals: petals very narrow or subfiliform: capsule spherical. — Nutt. in Torr. & Gray, l. c. 174; Brew. & Wats. Bot. Calif. i. 71. — Sand hills near San Diego, *Nuttall, Cleveland;* near San Bernardino, *Lemmon.* (Lower Calif., *Orcutt, Palmer.*)

17. LŒFLINGIA, L. (Dedicated to Peter Lœfling, a Swedish traveller and naturalist, born 1729.) — Small spreading glandular somewhat rigid annuals, with subulate inconspicuous leaves, and sessile solitary or more commonly fasciculate greenish flowers. — Gen. ed. 6, n. 52; DC. Prodr. iii. 380.

* Outer sepals provided with lateral teeth.

L. Texana, Hook. Branching from near the base: branches 4–6 inches long: flowers chiefly borne upon short secund and somewhat recurved branchlets: sepals straight or slightly curved: stamens in the flowers examined 3 (5 according to Hook. and Gray): seeds rather broadly obovate. — Icon. t. 285 (text with t. 275). Brandegee, Zoe, i. 219. *L. squarrosa*, Torr. & Gray, Fl. i. 674; Gray, Gen. ii. 23, t. 106 (Figs. 7 and 8 represent the seed too narrow and with cotyledons incumbent instead of accumbent as is the case); Coult. Man. of S. W. Tex. 31. — Central and Eastern Texas, *Drummond, Wright, Hall;* differing slightly, but as it appears constantly, from the following.

L. squarrosa, Nutt. Smaller, 2–4 inches high: branchlets scarcely or not at all secund: sepals pretty strongly recurved and squarrose: stamens 3 (–5?): seeds oblong or elliptical in outline. — Torr. & Gray, Fl. i. 174; Brew. & Wats. Bot. Calif. i. 72; Wats. Bibl. Index, 104 (excl. syn.); Brandegee, l. c. 219. — Sandy soil, California, San Diego northward to Sierra Co., *Lemmon*.

* * Sepals all entire.

L. pusilla, Curran. Low and condensed, 2–3 inches in height; branches closely flowered, not distinctly secund: sepals lanceolate, acute and bristle-tipped: stamens (in flowers examined) 3. — Bull. Calif. Acad. i. 152; Brandegee, Zoe, i. 220. — Tehachapi, California. 4,000 ft., *Mrs. Curran*. — This very interesting species has the calyx of a *Cerdia*, but is distinguished from that genus by the number of stamens, the absence of a style, and the accumbent position of the cotyledons, which in *Cerdia* appear to be constantly incumbent.

18. **STIPULICIDA**, Michx. (Name from the Latin *stipula*, stalk, blade, stipule, and *cædere*, to cut, from its deeply divided stipules.) — A monotype, scarcely differing in its technical characters from the Old World *Polycarpæa*, but with a very distinct habit, somewhat that of an *Eryogonum*. — Fl. i. 26, t. 6; Gray, Gen. ii. 25, t. 107.

S. setacea, Michx. l. c. A span high: root simple: the stems dichotomously forked: radical leaves spatulate, 2–4 lines long, narrowed to a slender petiole: flowers small, fascicled at the ends of the naked branches. — Chapm. Fl. 47. *Polycarpon stipulicidum*, Pers. Syn. i. 111; Pursh, Fl. 90. — Sandy soil, North Carolina to Florida.

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By B. L. Robinson.

Presented January 10, 1894.

I. — THE NORTH AMERICAN ALSINEÆ.

The following provisional treatment of the North American *Alsineæ* is based principally upon the material in the Gray Herbarium. An effort, however, has been made to see as large a representation of the group as possible, and with this end in view a number of other large and valuable collections have been visited; namely, the herbaria of the Department of Agriculture, Columbia College, the Missouri Botanical Garden, the Philadelphia Academy of Natural Sciences, the Boston Natural History Society, and the private collections of Mr. William M. Canby of Wilmington, Del., Mr. John Donnell Smith of Baltimore, and Mr. Walter Deane and Mr. Edward L. Rand of Cambridge, Mass. Those in charge of all these collections have most kindly allowed their *Caryophyllaceæ* to be examined, and all such specimens as showed any noteworthy peculiarities to be brought to Cambridge for critical study. From the herbaria of the Canadian Geological Survey, Iowa Agricultural College, and Natural History Society of Wilmington, Del., the entire representation of *Alsineæ* has also been most obligingly forwarded to the Gray Herbarium for examination.

While the study of such copious materials has obvious advantages, it by no means lessens, but rather increases, the difficulties of classification. In a long series of specimens individual variation becomes apparent in a way which can scarcely be realized if study is confined to fewer plants. Specific limitations often become very obscure, and sharp definition almost or quite impossible. Several instances of such practically confluent species occur in the present group, and in adjusting specific lines there is consequently great room for difference of opinion. Free criticism and friendly aid will be very

welcome, as much may thus be contributed to fulness and accuracy in the final treatment of this group for the "Synoptical Flora." To the botanists, both professional and amateur, who have most kindly assisted the author in his work upon the present paper, he would express sincere appreciation and cordial thanks. To the following he is especially indebted: Professors William Trelease and N. L. Britton, Mr. J. H. Redfield, Mr. F. V. Coville, Dr. J. N. Rose, Mrs. T. S. Brandegee, Miss M. E. Carter, Professor J. Macoun and Mr. J. M. Macoun, Professors T. C. Porter, L. H. Pammel, W. W. Bailey, and O. D. Allen, Messrs. William M. Canby, John Donnell Smith, Walter Deane, Edward L. Rand, Theodor Holm, and J. F. Collins. In the study of *Spergularia* an extensive series of Californian forms of that difficult genus, contributed to the Gray Herbarium by Mrs. T. S. Brandegee, has proved invaluable. In matters of synonymy and the citation of literature Dr. Watson's *Bibliographical Index* has again been a most useful guide.

CARYOPHYLLACEÆ, Tribe I. SILENEÆ. Including genera 1–7. (See Proc. Am. Acad. xxviii. 124.)

Tribe II. ALSINEÆ. Sepals free or slightly united at the very base. Petals more or less contracted but not unguiculate below. Corona absent. Flowers mostly small. Styles distinct to the base.

* Stipules none.

+ Capsule cylindric, more or less elongated, often curved, dehiscent by twice as many teeth as there are carpels.

8. Holosteum. Sepals 5. Petals 5, white, subentire or denticulate toward the apex. Stamens 3–5, very rarely 10. Styles 3 (occasionally 4 or 5), longitudinally stigmatic. Pod unicellular. Seeds numerous, dorsally flattened, i. e. parallel with the incumbent cotyledons; the radicle prominent upon the ventral surface. Inflorescence umbelliform.

9. Cerastium. Sepals in our species 5. Petals as many, retuse or bifid, very rarely subentire, white. Stamens 10, or sometimes fewer. Styles 5 (4 or 3). Capsule usually exceeding the calyx, often curved. Seeds numerous, more or less laterally compressed.

+ + Capsule ovoid or oblong relatively short, dehiscent by as many or twice as many teeth as there are carpels.

++ Styles usually fewer than the sepals, when of the same number opposite them.

10. Stellaria. Sepals 5 (–4). Petals 5 (–4, rarely abortive or absent), always more or less deeply bifid, often divided almost to the base, white. Stamens 3–10. Styles 3–4, rarely 5.

11. **Arenaria.** Sepals 5. Petals as many, white or nearly so, entire or emarginate (very rarely minute or wanting). Stamens 10, or often fewer by abortion. Styles 3 or 4. Seeds many.

†† †† Styles as many as the sepals and alternate with them.

12. **Sagina.** Sepals 5, (rarely 4). Petals as many, entire or emarginate, white, rarely obsolete. Stamens usually 5, less frequently 3–10. Valves of the capsule as many as the sepals, and opposite them. Seeds several to many.

* * Stipules present, scarious: petals undivided.

13. **Spergularia.** Sepals 5. Petals 5 (rarely fewer or none), reddish or white. Stamens commonly 10. Styles 3 (very rarely 5); ovary 1-celled; valves of the capsule as many as the styles, when 5 in number alternate with the sepals. Seeds often margined. Leaves linear or filiform.

14. **Spergula.** Sepals 5. Petals 5. Stamens 10 (rarely 5). Styles 5; ovary unilocular, many-ovuled. Valves of the capsule 5, opposite the sepals. Seeds acutely margined or narrowly winged. Leaves narrow, linear, verticillate and fascicled in the axils.

Tribe III. POLYCARPEÆ. Including genera 15–18. (See Proc. Am. Acad. xxviii. 126.)

8. **HOLOSTEUM,** L. (ὅλος, all, and ὀστέον, bone; used ironically, since the plants are soft and weak.) — A small genus of Old World annuals and biennials much resembling *Cerastium* except in inflorescence and seeds. The commonest species is adventive in America. — Gen. no. 928; Reichb. Icon. Fl. Germ. v. t. 221; Gay, Ann. Sci. Nat. ser. 3, iv. 23; Benth. & Hook. Gen. i. 148.

H. umbellatum, L. Finely glandular-pubescent, somewhat glaucous: stems 3–18 inches high: leaves sessile, ovate-oblong: umbels 3–12-flowered, terminal upon long naked peduncles; pedicels 8–12 lines long, some of them reflexed: filaments shorter than the calyx. — Spec. 88; Eng. Bot. i. 27. Locally naturalized in Pennsylvania, New Jersey, and Delaware, *Porter, Austin, Canby, Small.* (Adv. from Eur.)

9. **CERASTIUM,** L. Mouse-ear Chickweed. (κέρας, a horn, from the elongated curved capsules.) — Annuals or perennials, usually pubescent and often viscid. Leaves usually flat. Flowers white, borne in more or less expanded leafy or naked cymes. A genus distinguished from *Stellaria* and *Arenaria* somewhat by habit, but chiefly, although not always satisfactorily, by the form and dehiscence

of the capsule. — Gen. no. 376; Seringe in DC. Prodr. i. 414; Grenier, Flora, 1840, pt. 1, 266; Reichb. Icon. Fl. Germ. v.–vi. t. 228–236; Benth. & Hook. Gen. i. 148; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. 1 b, 80.

§ 1. STREPHODON, Seringe, l. c. Styles 3–5: teeth of the capsule finally circinate-revolute from the tip. — Our species have pubescent leaves.

C. Texanum, BRITTON. Annual, viscid: stems several, slender, nearly erect, leafy below, nearly naked and dichotomous above: leaves oblanceolate or spatulate, 6 lines to 2 inches in length, very pubescent or subcinereous on both surfaces: flowers rather small: petals bifid: styles 3–4 (–5?): capsule 1½–2 times the length of the calyx. — Bull. Torr. Club, xv. 97. — Hills, Blanco, Texas, *Wright;* New Mexico on the Mongollons, *Greene;* Arizona, Santa Cataline Mts., *Lemmon.* (Mex., *Palmer;* Lower Calif., *Brandegee.*)

C. maximum, L. Stoloniferous perennial with stems simple or nearly so, erect or decumbent, becoming a foot or more in height: leaves linear or lanceolate, attenuate: flowers very large for the genus, 1 inch in diameter, borne on erect pedicels in simple or branched cymes: sepals oblong or narrowly ovate, obtuse, 3–4 lines long: petals obovate, much exceeding the calyx, deeply notched at the apex: capsule symmetrical, much exserted at maturity. — Spec. 439; Ledeb. Icon. Fl. Ross. t. 242; Fenzl in Ledeb. Fl. Ross. i. 399; Seem. Bot. Herald, 51. *C. grande,* Greene, Pitt. ii. 229. — Alaska. (Siberia.) Asiatic specimens of this species, identified at the St. Petersburg Gardens, show that the capsule becomes cylindric and much longer than figured by Ledebour.

§ 2. ORTHODON, Seringe. Styles normally 5: teeth of capsule erect or spreading; the edges sometimes slightly reflexed. — DC. Prodr. i. 415. — Our species have pubescent leaves.

* Flowers comparatively small: petals 1–1½ times as long as the sepals.

– Pods 1–1¾ times as long as the calyx: introduced or doubtfully indigenous weeds.

C. VISCOSUM, L. (MOUSE-EAR CHICKWEED.) Annual, viscid pubescent, 3 inches to a span high: leaves oval or elliptic-oblong, very obtuse; the lowest narrowed below to a short margined petiole: flowers small, at first densely clustered at the ends of the branches, becoming laxer in fruit, but even the longest pedicels not exceeding the acute sepals (1¾–2 lines in length): bracts herbaceous: petals scarcely equalling the calyx: stamens frequently 5. — Spec. 437; Hook. f. Arc. Pl. 288; Wats. Bibl. Index, 101; Wats. & Coulter in

Gray, Man. ed. 6, 88. *C. vulgatum*, Linn. in herb.; Torr. & Gray, Fl. i. 187; Gray, Man. eds. 1–5; and others. *C. hirsutum*, Muhl. Cat. 46. *C. glomeratum*, Thuill. as used by Hooker, f. and others. *C. connatum*, Beck, Bot. 55. Depauperate forms with few flowers and short capsule have been regarded as indigenous, being the *C. viscosum*, var. *tenellum*, Grenier, l. c. 266, and the *C. semidecandrum*, auct. (not of Linn.). — Widely distributed in the United States and Canada, but much less common than the following; probably introduced from Europe. Delicate specimens apparently to be referred to this species, but with minute apetalous flowers, have been collected at San Diego, Calif., *Orcutt.*

C. VULGATUM, L. (COMMON MOUSE-EAR CHICKWEED.) Perennial, viscid-pubescent, a little taller and more spreading than the last: leaves oblong, obtusely pointed: flowers larger: the lower pedicels in fruit considerably exceeding the calyx: bracts herbaceous: sepals 2–3 lines long, obtuse, often purple-tipped, appearing acute through the infolding of the scarious margins: petals as long as the calyx. — Spec. ed. 2, 627; Regel, Ost-Sib. i. 432; Wats. Bibl. Index, 101; Wats. & Coulter in Gray, Man. ed. 6, 88. *C. viscosum*, Linn. in herb.; Torr. & Gray, Fl. i. 187; Gray, Man. eds. 1–5, etc. *C. fulvum*, Raf. Préc. Découv. 36. *C. triviale*, Link, Enum. Hort. Berol. i. 433. — Very common in fields, etc., but also often remote from habitations and cultivated ground, thus perhaps native. Flowering through the summer.

C. SEMIDECANDRUM, L. Near the two preceding, but smaller and with shorter leaves: the bracts, at least the upper ones, conspicuously scarious-margined: pedicels in fruit longer than the calyx. — Spec. 438; *C. vulgatum*, var. ? *semidecandrum*, Gray, Man. ed. 5, 94. — New Jersey, *Britton, Peters*, to Norfolk, Va., *Britton, Small.* (Adventive from Europe.)

← ← Pods 2–3 times as long as the calyx: indigenous species.

C. brachypodum. Pale green, finely pubescent and sometimes very viscid: leaves linear-oblong to oblanceolate, obtusish, seldom more than an inch in length: flowers in more or less open dichotomous cymes; pedicels, even the lower ones, only equalling or little exceeding the capsules, erect or deflexed, straight or gently curved, not hooked. — *C. nutans*, Raf., var. *brachypodum*, Engelm. in herb. — St. Louis, Mo., *Engelmann*, April, 1842, April–May, 1845; westward and southward to Nevada, *Anderson*, 238, *Watson*, 156; Arizona, *Palmer*; New Mexico, *Fendler*, 61; Texas, *Wright.* (Mex. *Schaffner, Palmer.*) *C. tenellum*, Fenzl, mentioned in Watson's Index (but never pub-

lished?), represented by Drummond's no. 30 of his 3d Texan Coll., appears to be only a more slender form of the above. Exactly the same thing, however, has been found at Milledgeville, Ga., by Dr. Boykin (Short Herbarium), thus considerably extending the range of the species. In raising Dr. Engelmann's variety to specific rank I follow the suggestion of Dr. N. L. Britton. Certainly, the more restricted geographic range and the absence of connecting forms indicate its distinctness from *C. nutans*. A very leafy and velvety tomentose form from Willow Spring, Arizona, *Palmer*, is worthy of mention.

Var. compactum. Inflorescence capitate-umbellate: pods very slender. — *C. nutans*, Raf., var. *compactum*, Engelm. in herb. — A marked variety or form from the Bad Lands of Nebraska, *Hayden;* Belknap, N. Texas, *Hayes;* False Washita, Ind. Terr., *Palmer*, 1868.

C. nutans, Raf. A pubescent and viscid annual, 8–18 inches high: stems branched: leaves oblong-lanceolate, acute; the lowest narrowed toward the base: flowers numerous in an open dichotomous cyme: calyx about 2 lines in length: petals somewhat exserted, oblanceolate, bifid: pedicels elongated, ascending or spreading, tending to be hooked or nodding at the summit: capsule 4–6 lines long, nodding but curved upward. — Préc. Découv. 36, & Desv. Journ. Bot. iv. 269 (1814); Gray, Gen. ii. t. 114. *C. longepedunculatum*, Muhl. Cat. 46. *C. glutinosum*, Nutt. Gen. i. 291. *C. apricum*, Schlecht. Linnæa, xii. 208. *C. oblongifolium*, Anderson, Cat. Pl. Nev. 118. — Common and widely distributed from New England to the Pacific and from Hudson Bay to New Mexico. Like the last, paler green than the other common species. Apetalous specimens have been found at Wawa, Penn., *Brinton*. Arizona forms of this species also differ slightly in habit, but lack technical characters for satisfactory distinction.

C. sericeum, Wats. Annual: stems one or many, 1–2 feet high, stout for the genus, sericeous, very leafy below: leaves oblong-lanceolate, sessile, 1–2 inches long, 3–6 lines broad; the lower cinereous with dense flocculent wool; the upper green: flowers numerous in spreading cymes: calyx $2\frac{1}{2}$ lines long, scarcely exceeded by the corolla. — Proc. Am. Acad. xx. 354. — S. Arizona in the Huachuca Mts., *Lemmon*; Santa Rita Mts., *Pringle*.

* * Flowers large; petals usually twice as long as the calyx: indigenous species.

C. arvense, L. Perennial: stems several, weak, usually almost naked above: leaves linear to narrowly lance-oblong: petals obcor-

date: pod in the typical form scarcely longer than the calyx. — Spec. 438; Hook. Fl. Bor.-Am. i. 104; Torr. & Gray, Fl. i. 188; Hollick & Britton, Bull. Torr. Club, xiv. 45. ? *C. hybridum*, Muhl. Trans. Am. Phil. Soc. ser. 1, iii. 170. *C. Pennsylvanicum*, Hornem. Hart. Hafn. 435. — Rocky soil, common; May–July. (Eu., Asia, & S. Amer.) Very variable in size, pubescence, relative length of its capsules, etc. Var. ANGUSTIFOLIUM, Fenzl, l. c. i. 413, with cauline leaves narrowly oblong to linear, attenuate at the base, much fascicled and 9–15 lines in length, and var. LATIFOLIUM, Fenzl, l. c. i. 412, with shorter oblong leaves, 6–8 lines long, broad at the base, are forms strikingly different in their extremes, but rather freely intergrading and often difficult to distinguish. The latter is perhaps a little more common in the Rocky Mountains but extends eastward to Labrador. Better marked are the following.

Var. oblongifolium, HOLLICK & BRITTON. Leaves oblong or lance-oblong, obtuse or obtusish: capsule longer, $1\frac{1}{2}$–$2\frac{1}{2}$ times as long as the calyx. — Bull. Torr. Club, xiv. 47, t. lxiii. *C. oblongifolium*, Torr. Fl. U. S. 460; Torr. & Gray, Fl. i. 188. ? *C. dichotomum*, Muhl. Cat. 46. ? *C. bracteatum*, Raf. Préc. Découv. 36. — Nova Scotia to Virginia, and Montana, *Scribner*, to New Mexico, *Vasey*. This variety has been widely drawn by its authors to include narrow-leaved forms as well as the original rather broad-leaved *C. oblongifolium*, extended series of specimens showing complete transitions.

Var. maximum, HOLLICK & BRITTON, l. c. xiv. 47. Taller, 1–2 feet high: leaves elongated, lanceolate, acutish, 2–3 lines broad: inflorescence very spreading: capsule equalling or half exceeding the calyx. — *C. oblongifolium*, Torr. Pacif. R. Rep. iv. 70. *C. pilosum*, Brew. & Wats., Bot. Calif. i. 67, not of Ledeb. — Dixon, Ill., *Vasey*, and in California, Punta de los Reyes, *Bigelow*, and elsewhere. Scarcely more than a rank growing form, but serving to connect the next species through var. *Fischerianum*.

Var. villosum, HOLLICK & BRITTON, l. c. xiv. 49. Densely villous: leaves rather broadly lanceolate. — *C. velutinum*, Raf. Med. Rep. (hex. 2), v. 359. *C. villosum*, Muhl. Cat. 46. Darlingt. Fl. Cest. ed. 2. 279. ? *C. hirsutum*, Darlingt. Florula Cest. 54. *C. oblongifolium*, Torr. & Gray, Fl. i. 188 in part; Wats. Bibl. Index, 101. — Lancaster Co., Penn., *Porter*.

Var. Fuegianum, HOOK. f. Depauperate, 2–3 inches high, with short thickish imbricated leaves and sub-solitary terminal flowers. — U. S. Expl. Exped. 119. — Specimens collected by *Coulter* in the

Yellowstone Park have been confidently referred to this variety by Hollick and Britton, l. c., and *Parry's* no. 41 from Northwestern Wyoming is doubtless the same.

C. alpinum, L. Densely silky: stems weak, matted: leaves elliptic-ovate, in the typical form only 4–5 lines long: petals notched at the apex, 1½–2 times the length of the sepals. — Spec. 438; Torr. & Gray, Fl. i. 188; Regel, Ost-Sib. i. 433, 434. *C. lanatum*, Lam. Encycl. i. 680. *C. latifolium*, Greville, Mem. Soc. Wern. iii. 429. *C. vulgatum*, Hook. f. Arc. Pl. 288 in part. ? *C. latifolium*, Hart., Trimen's Journ. of Bot. ix. 205. — Arctic America from Greenland to Alaska, also in Labrador, the Hudson Bay region, and upon the Rocky Mountains of British America. (Europe and Asia.) The following varieties extend farther southward.

Var. Beeringianum, Regel. Hirsute and less silky-villous, somewhat viscid above: leaves smaller, oblong. — Ost-Sib. i. 435. *C. Beeringianum*, Cham. & Schlecht., Linnæa, i. 62. *C. vulgatum*, var. *Beeringianum*, Fenzl in Ledeb. Fl. Ross. i. 409. — Alaska to the Rocky Mountains of Colorado and Arizona.

Var. Fischerianum, Torr. & Gray. Hirsute, taller, 8–10 inches or even more than a foot in height: leaves rather thick, elliptic-lanceolate or oval-lanceolate, acute or acutish, an inch or more in length: capsule 1½–2 (or rarely 3) times the length of the calyx. — Fl. i. 188; Regel, l. c. i. 438. *C. rigidum*, Ledeb. Mem. Petr. v. 538. *C. Fischerianum*, Seringe in DC. Prodr. i. 419. *C. vulgatum*, vars. *grandiflorum* and *macrocarpum*, Fenzl in Ledeb. Fl. Ross. i. 409, 410. To judge from the figure in the Calques des Dessins *C. stellarioides*, Moç. should be referred here also, having been placed by Seringe probably through error in § *Strephodon*. — A stout variety passing to *C. arvense*, var. *maximum*, but with broader more elliptic-ovate leaves and longer capsules. Alaska to Humboldt Co., Calif., *Rattan*. (Siberia, Japan.) The leaves are thicker and the sepals more pubescent and acute than in *C. pilosum*, Ledeb., to which it is also nearly related.

Var. glabratum, Hook. Leaves and calyx nearly smooth. — Parry's 2d Voy. 390; Fl. Bor.-Am. i. 104. — Arctic America with the pubescent forms. (N. Eur.)

§ 3. Dichodon, Bartl. Styles normally 3: teeth of the capsule erect or slightly spreading, not circinate-revolute. — Endl. Gen. 970. — Our species with symmetrical capsule and short glabrous leaves.

C. trigynum, Vill. Perennial, with stems weak, spreading, somewhat matted, smooth or glandular-pubescent, loosely 2–3 flowered:

leaves oblong, 3–5 (–8) lines in length; the uppermost ovate: sepals lance-ovate or oblong, obtuse, 2–3 lines long: petals 1½–2 times the length of the calyx, obcordate, bifid nearly half way to the base: capsule oblong-conic, twice the length of the calyx; the teeth finally spreading. — Dauph. iii. 645, t. 46; Fenzl in Ledeb. Fl. Ross. i. 396. *Stellaria cerastoides*, L. Spec. 422; Torr. & Gray, Fl. i. 184; Hook. f. Arc. Pl. 288. — Table-topped Mountain, Gaspe, Lower Canada, *Allen;* Cape Chudleigh, Hudson Strait, *Bell;* Labrador, Greenland, *Holm.* (Europe and Siberia.) A species now generally appended to *Cerastium*, but forming a transition to *Stellaria.*

Mœnchia quaternella, Ehrh. (*Sagina erecta*, L., *Cerastium quaternellum*, Fenzl.) An erect glaucous annual with subsimple stems, 2–3 inches high, bearing 1 or 2 erect 4-parted flowers, was found in the thirties near Baltimore by *B. D. Greene.* It is said to have been recently rediscovered there, but nothing more definite has been learned concerning its American occurrence. (Europe.)

10. STELLARIA, L. Chickweed, Starwort. (*Stella*, a star, in reference to the form of the flower.) — Low spreading herbs, sometimes a little succulent, mostly preferring a moist shaded habitat. Leaves flat or very rarely acerose. A genus conveniently but somewhat artificially separated from Arenaria by the more or less deeply cleft petals. — Spec. 421, & Gen. ed. 5, no. 504; Seringe in DC. Prodr. i. 396; Fenzl in Endl. Gen. 969; Reichb. Icon. Fl. Germ. v. t. 222–226; Benth. & Hook. Gen. i. 149; Gray, Gen. ii. t. 113; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. 1 b, 79. *Spergulastrum*, Michx. Fl. i. 275. *Micropetalon*, Pers. Syn. i. 509. *Larbrea*, St. Hil. Mem. Mus. Par. ii. 287.

§ 1. Myosoton, Mönch (as genus). Styles 5, alternate with the sepals: leaves ovate acute. — Method. 225. *Malachia*, Fries, Fl. Hall. 77.

S. aquatica, Scop. Perennial, with stem strongly angled and somewhat pubescent: leaves large, ovate, or ovate-lanceolate, acute; the upper sessile, cordate; the lower petiolate: pedicels glandular-viscid, deflexed in fruit: petals 1½–2 times as long as the campanulate glandular-pubescent calyx: seeds numerous, dark-colored, tuberculately roughened. — Fl. Carn. ed. 2, i. 319. *Malachia aquatica*, Fries, Fl. Hall. 77. *Larbrea aquatica*, Seringe in DC. Prodr. i. 395 (excl. synon.). — Becoming frequent upon waste land and public grounds in the Eastern States, and more or less established along roadsides in British America, Stratford, Ont., *Burgess;* Nanaimo, B. C., *Macoun.* (Adventive from Europe.)

§ 2. EUSTELLARIA, Fenzl, l. c. 969. Styles 3–4.

* Petals, except in some flowers of *S. pubera*, very deeply 2-parted (sometimes minute or wanting): segments narrow.

+ Lower leaves ovate, rather abruptly contracted into slender petioles.

S. MEDIA, Smith. (COMMON CHICKWEED.) A low annual: stem pubescent in lines: leaves acute; the upper narrower sessile, the lower on pubescent narrowly margined petioles: calyx glandular-pubescent, equalled or slightly exceeded by the capsule: petals shorter than the sepals: stamens 3, 5, or 10. — Eng. Bot. viii. t. 537. *Alsine media*, L. Spec. 272; Walt. Car. 117. *Holosteum succulentum*, L. Amœn. iii. 21; Nutt. Gen. i. 89; Torr. Fl. U. S. 159. — One of the commonest weeds in dooryards and cultivated grounds, especially in moist soil, flowering from early spring to late autumn.

S. prostrata, BALDW. Annual: stems weak, elongated, prostrate, pubescent: leaves ovate, acute or shortly acuminate, the lower subcordate on slender ciliated petioles; the upper cauline short-petioled or sub-sessile; the floral reduced and bractlike: pedicels filiform: flowers smaller than in the preceding: sepals in anthesis but a line long: petals nearly twice as long: mature capsule much exceeding the calyx; valves distinctly circinate-revolute. — Baldw. in Ell. Sk. i. 518; Torr. & Gray, Fl. i. 183; Gray, Pl. Lindh. ii. 152, & Pl. Wright. ii. 17; Chapm. Fl. 50. — Moist and shaded places, rocky woods; Georgia and Florida to Texas. (Adj. Mex.) Leaves very variable in size, from 2 lines to an inch in length. The flowers in this species are distinctly smaller than in the nearly related Mexican *S. cuspidata*, Willd., and *S. ovata*, Willd.

S. nitens, NUTT. Annual, slender, erect, shining: stems filiform, forked several times, leafy and slightly pubescent near the base, almost naked and quite glabrous above: leaves of two forms, the lowest (1–3 pairs) ovate, acute, only 2 lines long, on slender petioles of somewhat greater length, not always persisting; the other leaves lance-linear acute, 3–5 lines long: sepals very acute, scarious-margined, 1–3 nerved: petals half as long as the sepals, sometimes absent: capsule oblong, about equalling the calyx. — Torr. & Gray, Fl. i. 185; Torr. Pacif. R. Rep. iv. 69, & Bot. Mex. Bound. 37; Gray, Proc. Am. Acad. viii. 378. *S. mœnchioides*, Fenzl, acc. to Torr. & Gray, Fl. i. 675. *S. stricta*, Hook. Fl. Bor.-Am. i. 96 in part. — S. California to Brit. Columbia, *Macoun*; eastward to Utah, *Jones*; April, May.

S. GRAMINEA, L., with seldom persistent but sometimes slightly petiolate lower leaves, may possibly be sought here.

+ + Leaves acerose.

S. Kingii, Wats. Cespitose, minutely glandular-pubescent above: root woody: stems several, 2–7 inches high: leaves crowded below, rigid, pungent, light green: sepals spreading or somewhat reflexed during anthesis, scarious-margined, exceeded by the narrow petals. — Bot. King Exp. 39, t. vi. f. 1–3; Brew. & Wats. Bot. Calif. i. 68. — Humboldt Mts., N. Nevada, *Watson*; S. Utah, *Parry, Palmer*; July and August.

+ + + Leaves all sessile or subsessile, sometimes narrow, but not acerose.

++ Bracts small, scarious.

= Flowers small: petals minute or none.

S. umbellata, Turcz. Smooth: stems weak, ascending from a decumbent rooting base: leaves varying from lanceolate and acute to elliptic-oblong, 3–8 lines in length: pedicels filiform, sub-umbellately grouped at the ends of the branches, often deflexed: sepals small, 1–1¼ lines in length, glabrous, scarious-margined: capsule twice as long; the valves deeply 2-toothed; teeth obtuse. — Cat. Baic. 5, & Fl. Baic.-Dahur. i. 236; Fenzl in Ledeb. Fl. Ross. i. 394; Regel, Ost-Sib. i. 383, 399; Wats. Bot. King Exp. 38; Porter & Coulter, Fl. Col. 13; Brew. & Wats. Bot. Calif. i. 67. *S. borealis*, var. Hook. Fl. Bor.-Am. i. 94. — Mountains of Colorado and Arizona to Union Co., Oregon, *Cusick*. (Asia.)

= = Flowers of medium size: petals equalling or exceeding the calyx (except sometimes in *S. uliginosa*).

a. Seeds essentially smooth.

S. longifolia, Muhl. Stems sharply 4-angled, commonly 8 inches or more in height: leaves linear or linear-oblong, somewhat narrowed at each end, thickish, often ciliate toward the base; the larger ones 1¼–1½ inches long: flowers rather numerous in a lateral long-pedunculed open cyme; pedicels spreading, horizontal or deflexed: petals and capsule exceeding the sepals: seeds smooth. — Cat. 45; Willd. Enum. 479; Fenzl, l. c. i. 392; Gray, Gen. ii. 38, t. 113, f. 1–5. *S. graminea*, Bigel. Fl. Bost. 110. *Spergulastrum gramineum*, Michx. Fl. i. 276. *Micropetalon gramineum*, Pers. Syn. i. 509. *M. longifolia*, Eat. & Wright, N. A. Bot. ed. 8, 319. — Canada to Maryland and westward to the Rocky Mts.; June and July. (Europe and Asia.)

S. longipes, Goldie. Smooth and shining or more or less glaucous, spreading at the base: branches erect, 3–12 inches high: leaves linear or lance-linear, gradually narrowed from the base to the acute apex, 1-nerved, 8–12 lines in length, spreading: flowers irregu-

larly cymose: peduncles terminal or rarely and tardily somewhat lateral; pedicels elongated, unequal, erect; the lowest often more or less distinctly axillary: sepals oblong-lanceolate: capsule exceeding the calyx, acutish, dark and shining; seeds very smooth. — Edinb. Phil. Journ. vi. 327; Hook. Fl. Bor.-Am. i. 95; Torr. & Gray, vars. α, β, and γ, Fl. i. 184; Fenzl, l. c. i. 386. *S. palustris*, Richardson, Frankl. Journ. 738. *S. stricta*, Richardson, Frankl. 2d Journ. 15. *S. læta*, Torr. Ann. Lyc. N. Y. ii. 169. *S. glauca*, Meyer, Pl. Lab. 93. *S. crassifolia*, Wats. Bot. King Exp. 38. *S. longifolia*, Rothr. Enum. Pl. Cent. Col. 35. ? *Micropetalon gramineum*, James, Cat. 181. — A variable species marked by its long dark-colored acutish capsule and very smooth seeds. It is widely distributed from Maine to Arctic America, and from Alaska (Siberia) southward along the Rocky Mountains to Colorado and on the Pacific slope to San Bernardino, *Parish*. The commoner form has acute sepals and leaves varying imperceptibly from flaccid and spreading to erect and somewhat pungent. (Var. β of Torr. & Gray, Fl. i. 185. *S. stricta*, Richardson, etc.) The typical form with spreading leaves and "very obtuse" sepals is comparatively rare. The following, although the best marked varieties, are connected by innumerable puzzling intermediate forms.

Var. læta, Wats. Low, smooth or somewhat pubescent, 1–4 inches in height, usually very glaucous, densely leafy at the base: leaves carinate, lanceolate-subulate to linear, rather rigid, erect, 2–6 lines long, shorter than in the type, narrower than in the following. — Bibl. Index, 112. *S. læta*, Richardson, Frankl. Journ. 738; Hook. in Parry's 2d Voyage, 300, & Fl. Bor.-Am. i. 96. *S. stricta*, var. γ, Hook. l. c. i. 96. *S. longipes*, var. δ, Torr. & Gray, Fl. i. 185. — Arctic America to the Rocky Mountains of Montana and Wyoming to Gaspe, *Allen*. (Siberia.) A very similar form has been found on the coast of New Brunswick, *Fowler*. The variety PEDUNCULARIS of Fenzl is a boreal form somewhat intermediate between this variety and the next, and indefinitely characterized by still more elongated pedicels.

Var. Edwardsii, Wats. Low, smooth or pubescent: leaves lanceolate to ovate-lanceolate or even ovate, shorter than in the type: stems usually but 2–3-flowered; the lower peduncles axillary, much longer than the others. — Bibl. Index, 113. *S. Edwardsii*, R. Br. in Parry's 1st Voy. 271, 308; Cham. & Schlecht. Linnæa, i. 48; Hook. Fl. Bor.-Am. i. 96, t. 31; Hornem. Fl. Dan. xiii. t. 2290. *S. nitida*, Hook. in Scoresb. Greenl. 411; Cham. & Schlecht. l. c.

i. 47. — British America from Labrador to British Columbia, northward to the Arctic regions; Alaska. (Siberia.)

b. Seeds distinctly rugose-roughened under a lens.

S. GRAMINEA, L. Stems ascending, smooth and shining, 1–2½ feet high, sharply 4-angled (rhombic in cross-section); internodes usually elongated: leaves lanceolate or lance-linear, thickish, attenuate, furrowed above and with midrib prominent beneath: inflorescence a broad terminal pedunculate cyme, often accompanied by one or two smaller cymes springing at its base; pedicels elongated, spreading, or deflexed: capsule exceeding the calyx. — Spec. 422; Eng. Bot. xii. t. 803; Fenzl in Ledeb. Fl. Ross. i. 391; Wats. & Coulter in Gray, Man. ed. 6, 87. — Introduced in moist grassy places, Nova Scotia to New Jersey, and in Northern States across the continent; common. (Europe.)

S. uliginosa, MURR. Low, weak, diffuse: stems numerous, leafy: leaves lanceolate or elliptic-lanceolate, 6–8 lines long, acute at each end: inflorescences few-flowered, pedunculate or sub-sessile, much smaller than in the last, becoming decidedly lateral, 1½ inches or less in length: flowers smaller and petals relatively shorter than in the related species: sepals very acute, 1¾ lines in length. — Comm. Gött. 1778, 55; Fenzl, l. c. i. 393; Eaton & Wright, N. A. Bot. 442; Warming, Bot. Foren. Festkr. 1890, 216, f. 10. *S. aquatica*, Poll. Palat. i. 429; Torr. & Gray, Fl. i. 186. *S. alsine*, Hoffm. Fl. Germ. i. 153; Muhl. Cat. 45; *S. borealis*, Darlingt. Fl. Cest. 274. *Larbrea uliginosa*, Hook. Fl. Bor.-Am. i. 93. — Swamps, Atlantic slope, Halifax (*Macoun*) to Maryland; rare. (Europe.)

+ + Bracts foliaceous (except in *S. borealis*, var. *corollina*.)

= Leaves narrowly elliptical to lanceolate or linear.

S. longipes, GOLDIE, may be sought here, as weak specimens with solitary terminal long-peduncled flowers do not always show the scarious bracts which are developed in more vigorous plants.

S. borealis, BIGEL. Suberect, 6–10 inches in height, smooth or nearly so: leaves lanceolate, attenuate, 6–18 lines long, with one prominent nerve: pedicels scattered, 8–14 lines in length, often deflexed: sepals ovate-lanceolate, scarious-margined, acute or often narrowed to an obtusish apex: petals much shorter than the calyx or none: capsule narrowly ovoid, acutish, 1½–2 times as long as the sepals; seeds smooth. — Fl. Bost. ed. 2, 182; Torr. & Gray, Fl. i. 185; Fenzl, l. c. i. 381; Vahl, Fl. Dan. xiv. t. 2355. *S. calycantha*, Bong. Sitch. 127. *S. crassifolia*, Boland. Cat. 6. *Spergulastrum*

lanceolatum, Michx. Fl. i. 275. *Micropetalon lanceolatum*, Pers. Syn. i. 509. *Arenaria calycantha*, Ledeb. Mem. Acad. Petr. v. 534. *A. lateriflora*, Darlingt. Florula Cest. 54. — New England to New Jersey; Mendocino Co., Calif., and northward; flowering in mid summer; frequent.

Var. corollina, Fenzl, l. c. i. 382. Taller: inflorescence spreading and more definitely terminal: bracts reduced, the uppermost more or less scarious: petals usually present: seeds slightly roughened. — *S. brachypetala*, Bong. Sitch. 126; Torr. & Gray, Fl. i. 186. *S. alpestris*, Fries, Mant. i. 10, excl. var. *S. Fenzlii*, Regel, Ost-Sib. i. 399. *S. borealis*, var. *alpestris*, Gray, Man. ed. 5, 93. — Lake Superior, *Robbins*, to Oregon, *Howell*, and northward. (Europe and Asia.)

S. crassifolia, Ehrh. Low, smooth: stems many, weak, ascending or suberect, internodes short: leaves small, numerous, thickish, oblong-lanceolate, acutish, 3–6 lines in length: sepals ovate-lanceolate, acuminate, somewhat exceeded by the petals and capsule: seeds distinctly roughened under a lens. — Beitr. iii. 60; Fenzl, l. c. i. 383; Chapm. Fl. ed. 2, 608; Wats. & Coulter in Gray, Man. ed. 6, 87, excl. Kentucky plant. *S. gracilis*, Richardson, Frankl. Journ. 738; Hook. Fl. Bor.-Am. i. 97; Torr. & Gray, Fl. i. 184. *S. borealis*, var. *β*, Hook. l. c. i. 95. — Labrador, *Martin*, *Allen*, to Illinois, *Vasey*, *Hill;* Montana, *Canby*, and northward.

S. fontinalis. Glabrous, stems regularly and dichotomously branched, 6–12 inches long: branches spreading: leaves spatulate-linear, obtusish, spreading, 5–10 lines long: internodes elongated, 1–2 inches in length: peduncles solitary in the forks of the branches, 1–1½ inches long, ascending: sepals 4–5, oblong, obtuse, 3-nerved: petals none: stamens 4–8: styles 3–4, very short: capsule obtuse, not exceeding the calyx. — *S. crassifolia*, Wats. Bibl. Index, 111 in part; Wats. & Coulter in Gray, Man. ed. 6, 87 in part. *Sagina fontinalis*, Short & Peter, Transylv. Journ. Med. 28, 600; Torr. & Gray, Fl. i. 177. *Spergula fontinalis*, Dietr. Syn. Pl. ii. 1597. — Cliffs of Kentucky River and Elkhorn Creek, Kentucky, *Short & Peter;* Nashville, Tenn., *Gattinger;* April, May. This too little known plant, of distinctly aquatic habit, merits further study with more abundant material. It is certainly distinct from *S. crassifolia*, Ehrh.

S. humifusa, Rottb. Low, densely matted, smooth: stems prostrate or ascending, angulate, shining: leaves elliptic-ovate or oblong, acutish, 2–5 lines long, marcescent: peduncles axillary. 4–7 lines in length: sepals ovate-oblong, acute, narrowly margined: petals

somewhat exceeding the calyx: seeds smooth. — Act. Hafn. x. 447, t. 4, f. 14; Torr. & Gray, Fl. i. 184; Fenzl in Ledeb. Fl. Ross. i. 384. *S. marginata*, Cham. & Schlecht. Linnæa, i. 50. *Arenaria thymifolia*, Pursh, Fl. 317; Eaton & Wright, N. A. Bot. 132. *A. Purshiana*, Seringe in DC. Prodr. i. 414; Hook. Fl. Bor.-Am. i. 102. — Salt marshes and boggy slopes, Little Cranberry Island, Maine, *Redfield*, and coast of Oregon, *Howell Bros.*, northward to Alaska and Arctic America. (Greenland; N. Asia.) The commoner form, var. OVALIFOLIA, Fenzl, l. c., has leaves ovate or sub-orbicular, crowded, but 1–3 lines in length; var. OBLONGIFOLIA, Fenzl, l. c., has more elongated internodes and oblong leaves, 4–5 lines long.

S. obtusa, ENGELM. Smooth: stems prostrate, 2–3 inches long: leaves thin, ovate, acute, about 4 lines long, half as broad: flowers solitary, appearing axillary: peduncles 3–4 lines long: sepals ovate, obtuse, hardly at all scarious on the margins: petals none: capsule $1\frac{1}{4}$–$1\frac{1}{2}$ times as long as the calyx, obtuse; seeds brown, under a compound microscope covered with lighter colored oblong tubercles with fringed edges. — Bot. Gaz. vii. 5; Macoun, Cat. Canad. Pl. 76. *S. humifusa*, Macoun, Phænog. & Cryptog. Pl. of Canad. 9. — Anthracite Creek, Colorado, 9,000–10,000 feet, *Brandegee;* near Macleod's Lake, Brit. Columbia, *Macoun;* Kootanie Pass, B. C., *Dawson;* June, July.

S. crispa, CHAM. & SCHLECHT. Smooth, or more rarely pubescent: stems numerous, weak, decumbent: leaves thin, ovate, acuminate, commonly crisped on the edges: pedicels solitary, 3–6 lines long: sepals lanceolate, acute, margined, 3-nerved, considerably exceeded by the acutish capsule: petals minute or none. — Linnæa, i. 51; Hook. Fl. Bor.-Am. i. 97; Torr. & Gray, Fl. i. 186, 675; Gray, Proc. Am. Acad. viii. 378. *S. borealis*, var. *crispa*, Fenzl ex Torr. & Gray, Fl. i. 675; Torr. Bot. Wilkes Exp. 245. *S. borealis*, var. *apetala*, Regel, Ost-Sib. i. 396 in part. — Mountainous regions of N. Calif. to Alaska.

S. ruscifolia, WILLD. Glabrous: leaves coriaceous, ovate, subcordate, acuminate, somewhat rigid with pungent tip: flowers rather large, terminal, pedunculate: sepals acute. — Willd. in herb. acc. to Schlecht. Berl. Gesell. Nat. Fr., Mag. 1816, 194; Cham. & Schlecht. l. c. i. 50; Regel, Ost-Sib. i. 419. (Siberia, Kamtschatka.)

Var. arctica, REGEL, l. c. i. 420. "Low stems, scarcely an inch in length, sepals obtuse. — On the Melville Islands."

= = Leaves broad, an inch or more in length.

S. littoralis, TORR. Pubescent; stems decumbent, dichotomously branched, 8 inches in height: leaves ovate, rounded at the

base, acute or acuminate, about an inch in length, with definite intramarginal veins: flowers rather numerous in the forks of the branches; peduncles becoming horizontal or reflexed: sepals $2\frac{1}{2}$ lines long, acute: petals of nearly equal length, cleft almost to the base: capsule somewhat shorter. — Pacif. R. Rep. iv. 69; Brew. & Wats. Bot. Calif. i. 68. — Coast of Marin Co., Calif.; Punta de los Reyes, *Bigelow;* Dillon's Beach, *Congdon.* In habit much resembling the Old World *S. dichotoma*, L., of which it may well prove a form. It differs, however, in its much more deeply cleft petals.

S. pubera, Michx. (Great Chickweed.) Perennial, decumbent, stout for the genus: stems pubescent in lines: leaves elliptic-oblong, finely ciliate, acute or obtusish, $\frac{1}{2}$–$1\frac{1}{2}$ inches long, or on the late tall and mostly sterile shoots 3 inches in length: calyx nearly or quite smooth; sepals 3–$4\frac{1}{2}$ lines in length: stamens 10: capsule globose, not exceeding the calyx. — Fl. i. 273; Darlingt. Fl. Cest. 274; Torr. & Gray, Fl. i. 183. — Rocky woods, Pennsylvania to Georgia, westward to Tennessee, Kentucky, and Indiana. Professor Britton calls attention to the fact that the teeth of the capsule become circinate-revolute, as in *Cerastium* § *Strephodon.* Miss E. F. Andrews states that the petals are sometimes cleft half their length, in other cases nearly to the base, which is confirmed by specimens.

* * Petals retuse or shortly bifid, divided but $\frac{1}{4}$–$\frac{1}{2}$ the way to the base, commonly considerably exceeding the calyx: species approaching *Arenaria.*

+ Glabrous or nearly so.

S. uniflora, Walt. Weak and slender: stems decumbent or suberect, a foot in length: leaves linear, acute, or the lower lanceolate, gradually narrowed below, mucronate, 8–12 lines in length; the floral much reduced: flowers few, solitary, on elongated slender peduncles: calyx soft in texture; sepals scarcely veined. — Car. 141; Torr. & Gray, Fl. i. 184; Chapm. Fl. 50. *Arenaria glabra,* Ell. Sk. i. 520, not Michx.; Wood, Bot. & Fl. 56. *Alsine Walteri,* Gray, Gen. ii. 34. — Moist meadows, North Carolina to Florida and Alabama, *Winchell;* March to May.

S. macropetala, Torr. & Gray, appears to be only a form of *Arenaria patula,* Michx., a species in which the petals vary from entire to retuse or even bifid.

S. Holostea, L. Stem sharply 4-angled, 6–18 inches high: leaves narrowly lanceolate, spreading, long-attenuate from near the rounded sessile base, often ciliated, $1\frac{1}{4}$–3 inches in length, 1-nerved: sepals lance-oblong, thin, nerveless, 4 lines in length, exceeded by the large white petals: styles 3: valves of the capsule at length circinate-

revolute. — Spec. i. 422; Reichb. Icon. Fl. Germ. v. t. 223. — Found more or less established at Train's Meadow Road, Long Island, *Ruger;* Poland, Maine, *Miss Furbish.* (Adv. from Europe.)

+ + Glandular-pubescent.

S. dichotoma, L. Stems terete, profusely and dichotomously branched: leaves ovate to ovate-lanceolate, acute or acutish, cordate, spreading, 6–12 lines in length: peduncles 1-flowered, springing from the forks of the branches, considerably exceeding the leaves, commonly deflexed in fruit: sepals lanceolate, acute, usually about equalling the petals. — Spec. 603; Fenzl in Ledeb. Fl. Ross. i. 378. — An Asiatic species of great variability.

Var. Americana, Porter, in litt. Leaves oval, obtusish: sepals oblong, obtuse, but 1½ lines long, considerably exceeded by the rather narrow white petals. — Collected near Virginia City, Montana, 1871, by *W. B. Platt* on the Hayden Survey, and sent to the Gray Herbarium by Prof. T. C. Porter. A portion of the same material has been kindly examined by Messrs. Batalin, Korshinsky, and Lipsky, who pronounce it a variety or form of *S. dichotoma*, near var. *cordifolia*, Bunge, but with more obtuse leaves and sepals.

S. Jamesii, Torr. Viscid above: stem strongly angled: leaves elongated, lanceolate, attenuate, smooth, 2–4 inches in length, 3–8 lines broad near the closely sessile base: flowers in a leafy terminal panicle: sepals oblong, herbaceous, 2 lines in length. — Ann. Lyc. N. Y. ii. 169 (as *S. Jamesiana*); Pacif. R. Rep. iv. 69; Torr. & Gray, Fl. i. 183; Wats. Bot. King Exp. 38. ?*S. graminea*, James, Cat. 181. — Woodlands and "creek bottoms," Rocky Mts. of Colorado, New Mexico, and Arizona to Northern California and Washington, *Brandegee.*

S. Nuttallii, Torr. & Gray. Annual, a span high: leaves linear-oblong, obtusish; the upper much reduced but not scarious: flowers in dichotomous racemes; pedicels horizontally spreading, 9 lines in length: corolla 6–8 lines broad. — Fl. i. 183; Fielding, Sert. Pl. t. 18. *Alsine Drummondii*, Fenzl ex Torr. & Gray, l. c. i. 675. *Alsine Nuttallii*, Gray, Gen. ii. 34. — Arkansas, *Nuttall;* Louisiana, *Hale;* Central Texas, *Wright, Lindheimer, Drummond, Hall,* etc.

11. ARENARIA, L. Sandwort. (*Arena*, sand, a sandy place, from the habitat of several species.) — A composite genus, and, when taken as here in its more comprehensive sense, the largest of the *Alsineæ.* Plants of wide distribution both as regards latitude and altitude, and possessing in consequence much variability in aspect; being either slender annuals or herbaceous perennials of the habit of

Stellaria, or often more densely tufted and occasionally distinctly woody at the base. Leaves sessile or nearly so, either flat and with a well developed blade or more frequently awl-shaped or acerose. Flowers of *Stellaria*, but with petals entire or barely retuse (sometimes more deeply cleft in *A. patula*, Michx.). — Gen. no. 374 in part; Torr. & Gray, Fl. i. 178; Reichb. Icon. Fl. Germ. v. t. 216–219; Benth. & Hook. Gen. i. 150; Wats. Bibl. Index, 94; Hook. & Jackson, Index Kew. i. 178.

§ 1. Mœhringia, L., as amended by Fenzl. Seeds, at least when young, provided at the hilum with a light-colored spongy appendage (strophiole). Habit of *Stellaria*. — Fenzl in Endl. Gen. 968; DC. Prodr. i. 390; Gray, Gen. ii. t. 112.

A. lateriflora, L. Stems terete, weak, often decumbent, puberulent: leaves elliptic-oblong or oval, obtuse or rounded at the apex, thin, puberulent, 5–10 lines long; the veins and edges beneath covered with a fine spreading pubescence: cymes pedunculate and somewhat umbellately few-(1–6-)flowered: sepals ovate, obtuse or scarcely acute, $1\frac{1}{4}$ lines long, but one third to one half the length of the obovate petals: filaments pubescent. — Spec. 423; Hook. Fl. Bor.-Am. i. 102, t. 36; Torr. & Gray, Fl. i. 182, 675. *A. Pennsylvanica*, Muhl. Ind. Fl. Lanc. 169. *A. buxifolia*, Poir. in Lam. Encycl. vi. 362; Torr. & Gray, Fl. i. 182. *A. Haenkeana*, Bartl. in Presl, Rel. Haenk. ii. 15. *Stellaria biflora*, Pursh, Fl. 317. *Mœhringia lateriflora*, Fenzl, Verbr. Alsin. 18, 38, & Ledeb. Fl. Ross. i. 371; Gray, Gen. ii. 36, t. 112. — New England to New Jersey, Colorado, Oregon, and northward to the Arctic Ocean.

A. macrophylla, Hook. Stems decumbent, angled, pulverulent-pubescent: leaves lanceolate, acutish to acuminate at both ends, (less commonly elliptic, obtusish,) 1–3 inches in length, glabrous, more or less punctate: peduncles slender, terminal or becoming axillary, 1–5-flowered: sepals ovate-lanceolate, very acuminate, exceeding the petals. — Fl. Bor.-Am. i. 102, t. 37; Torr. & Gray, Fl. i. 182; Torr. Pacif. R. Rep. iv. 69; Gray, Proc. Am. Acad. viii. 378; Greene, Fl. Francis. 125. *Mœhringia macrophylla*, Torr. Bot. Wilkes Exp. 246. — Extending from San Diego (*Orcutt*) northward through California, Oregon, and Washington into British America, and eastward to Isle St. Ignace, Lake Superior, *Wheeler*; April to August. While the essential floral characters remain the same, there is considerable variation in the size, texture, and shape of the leaves.

§ 2. Ammadenia. Styles 3–5: disk conspicuous, 10-lobed and glanduliferous: capsule globose, somewhat baccate; seeds not strophio-

late. — Gmelin, Fl. Sib. iv. 160 (proposed as genus). *Arenaria* § *Ammodenia*, Benth. & Hook. Gen. i. 151. *Honkenya*, Ehrh. Beitr. ii. 180. *Halianthus*, Fries, Fl. Hall. 75. *Adenarium*, Raf. Journ. Phys. 1818, 259. — A single stout fleshy species of maritime habitat, with axillary flowers.

A. peploides, L. Perennial, glabrous: stems a span in height, stout, angled: leaves thick, ovate or obovate, 1-nerved, shortly pointed, clasping at the broad base: sepals ovate-lanceolate, acuminate, $3\frac{1}{2}$ lines in length, about equalling the petals. — Spec. 423; Pursh, Fl. 317. *Alsine peploides*, Crantz, Inst. ii. 406. *Honkenya peploides*, Ehrh. l. c. ii. 181; Torr. & Gray, Fl. i. 176; Fenzl in Ledeb. Fl. Ross. i. 358; Gray, Gen. ii. 32, t. 110. *Adenarium peploides*, Raf. l. c. 259. — Seashores, from New Jersey and Washington State, *Henderson*, northward. (Northern Europe and Asia.) On the Northwest Coast the commoner form is

Var. major, Hook. Taller: leaves longer, often 15 lines in length, oblong or oblanceolate, more pointed and decidedly narrowed to the base. — Fl. Bor.-Am. i. 102. *A. Sitchensis*, Dietr. Syn. Pl. ii. 1565. *Honkenya oblongifolia*, Torr. & Gray, Fl. i. 176. *Honkenya peploides*, var. *oblongifolia*, Fenzl in Ledeb. Fl. Ross. i. 358.

§ 3. Merckia. Styles 3–5; ovary 3–5-celled: capsule large, depressed-globose, somewhat inflated, many-seeded; seeds not strophiolate. — Fisch. ex Cham. & Schlecht, Linnæa, i. 59 (as genus). Fenzl, l. c. i. 359; Pax in Engler & Prantl, Nat. Pflanzenf. iii. 1 b, 84. *Arenaria* § *Merckia*, Benth. & Hook. Gen. i. 151. — A single glandular and slightly fleshy species of the Northwest.

A. physodes, Fisch. Perennial, cespitose; stems weak, decumbent, 3–6 inches in length: leaves ovate, cuspidately pointed, 4–6 lines long: flowers solitary at the summit of the stem or becoming lateral: sepals lance-oblong, acute, 3 lines in length, equalling or slightly exceeding the petals: capsule 4 lines (said to become half an inch) in diameter. — Fisch. in DC. Prodr. i. 413; Wats. Bibl. Index, 97. *Merckia physodes*, Fisch. l. c. i. 59; Hook. l. c. i. 103; Torr. & Gray, Fl. i. 176. *Stellaria ovalifolia*, Hook. l. c. i. 97; Hook. & Arn. Bot. Beech. 122. — Brit. Columbia to N. Alaska; July, August.

§ 4. Euarenaria. Styles normally 3: capsule ovoid, dehiscent by three two-toothed or cleft valves; seeds not strophiolate. — *Arenaria* of many authors, as Fenzl in Ledeb. Fl. Ross. i. 360; Regel, Radde's Reisen in Ost-Sib. i. 334; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. 1 b, 84, etc.

* Leaves ovate, elliptic or linear, not acerose.

← Annuals.

A. SERPYLLIFOLIA, L. (THYME-LEAVED SANDWORT.) Annual, finely pubescent, much branched: leaves very short, 2–3½ lines in length, ovate, acute or acuminate, rather distinctly 3–5-nerved, rounded at the base; the lowest only being narrowed to a short petiole: flowers numerous in open leafy cymes; pedicels 1–3 times the length of the ovate-lanceolate acuminate hispidulous sepals: petals small, about two thirds the length of the sepals: capsule flask-shaped. — Spec. 423; Michx. Fl. i. 274; Ell. Sk. i. 518; Torr. & Gray, Fl. i. 182. — Sandy soil, Lower Canada and New England to Florida and to Oregon, Washington, and British Columbia. (Nat. from Europe.)

Var. TENUIOR, Koch. More delicate: leaves reduced: flowers smaller in a nearly naked racemose panicle: capsule more oblong.— Synop. 117. *A. leptoclados*, Guss. Fl. Sic. Syn. iii. 824. — Portland, Oregon, *Brandegee*. Suksdorf's specimens from McCloud Lake are somewhat similar. (Europe.)

A. Benthamii, FENZL in herb. A slender annual, branched from the base; branches finely pubescent in lines: leaves short, 3–4 lines in length, elliptic-lanceolate, acute and apiculate, often punctate, narrowed to a sessile base, or the lowest to short ciliated petioles; floral leaves much reduced: pedicels filiform, many times exceeding the ovate acuminate glabrous often punctate sepals: seeds dark brown, minutely tuberculate. — Torr. & Gray, Fl. i. 675; Gray. Pl. Wright. ii. 18; Torr. Bot. Mex. Bound. 36. *A. monticola*, Buckley, Proc. Acad. Philad. 1861, 449. — Rocky ground, Texas, *Drummond, Wright, Thurber, Hall, Reverchon;* New Mexico, *Thurber*.

← ← Perennials.

A. ciliata, L. Minutely glandular-puberulent: stems numerous, slender, terete, leafy, densely matted, or in less exposed situations spreading and ascending, 1–5 inches long, terminally 1–3-flowered: leaves small, ovate-oblong or lance-oblong, scarcely acute, 1–3 lines in length, distinctly ciliate near the cuneate base: peduncles erect, 2–5 lines long: sepals ovate-oblong, obtuse, nerved, 1¼–1½ lines long: petals of similar shape and equal length: stamens 8–10: valves of the capsule rather deeply bifid exceeding the calyx. — Spec. 425; DC. Prodr. i. 411; Fenzl in Ledeb. Fl. Ross. i. 370. (High mountains and arctic regions of Europe.)

Var. (?) humifusa, HORNEM. Leaves without ciliation: sepals nerveless. — Hornem. ex Lange, Pl. Grœn. 132. *A. Norvegica*, Gunn, Fl. Norv. ii. 145, t. ix. f. 7–9. *A. humifusa*, Wahlb. Fl. Lap.

129. — Rich soil, British America, Mt. Albert, Gaspe, *Allen, Porter*; Lake Mistassini, *J. M. Macoun*, and what is with scarcely a doubt the same thing at Kicking Horse Lake in the Rocky Mts., *J. Macoun*. (Greenland, N. Europe.)

A. alsinoides, WILLD. in herb. Minutely pubescent with slightly hooked hairs or smoothish: stems long, procumbent, moderately branched: leaves narrowly elliptic, acute, narrowed below, commonly pseudoverticillate, 8–10 lines long, punctate: flowers axillary, solitary at the nodes: pedicels filiform, elongated, spreading or horizontal, nearly or quite an inch in length: sepals ovate, acute, tuberculate-punctate, $1\frac{3}{4}$ lines long: petals commonly smaller or wanting: seeds smooth and shining. — Schlecht. Berl. Mag. Naturf. Freunde, vii. (1816), 201; Wats. Proc. Am. Acad. xvii. 327. *A. diffusa*, Ell. Sk. i. 519. *A. nemorosa*, HBK. Nov. Gen. et Sp. vi. 35. *A. lanuginosa*, Rohrb. in Fl. Bras. xiv.^{2} 274, t. 63. *Spergulastrum lanuginosum*, Michx. Fl. i. 275. *Micropetalon lanuginosum*, Pers. Syn. i. 509. *Stellaria elongata*, Nutt. Gen. i. 289. *S. lanuginosa*, Torr. & Gray, Fl. i. 187, 675. — Moist shaded ground, North Carolina to Florida and Texas, *Drummond, Hall.* (Mexico and S. Amer.)

A more western form, represented from New Mexico by Fendler's 58 and 62 and Wright's 864, has slightly firmer stems, more numerous sub-paniculate flowers, and leaves less narrowed at the base. In all these respects it shows a transition to the following.

A. saxosa, GRAY. Finely puberulent but green: stems many, spreading from a rather stout root, decumbent or creeping at the base, 2 inches to a foot long: leaves numerous, opposite, not fascicled or pseudoverticillate (sometimes crowded), slightly fleshy, lance-oblong, acute, mucronate, 2–9 lines long, sessile by a scarcely narrowed base: flowers terminal and subsolitary on short simple peduncles or in stouter individuals numerous and more or less paniculate: petals almost or quite equalling the ovate-lanceolate sharply acuminate slightly fleshy sepals. — Pl. Wright. ii. 18; Walp. Ann. iv. 258. *Mœhringia umbrosa*, Gray Pl. Fendl. 13, & Pl. Wright. ii. 18, not Fenzl. — Colorado, *Brandegee, Hooker & Gray*; Guadalupe Mts., Texas, *Havard*; New Mexico, *Fendler, Wright*; Arizona, *Rothrock, Lemmon, Jones, Rusby*. (Lower California, *Orcutt*.) A species of wide range, occurring alike in rocky subalpine regions and much lower upon sandy banks, accordingly varying much in height and diffuseness of branching. The type is a condensed few-flowered form.

Var. cinerascens. Somewhat more rigid, and grayish throughout with a fine pubescence: leaves pungent. — Huachuca Mts., Arizona, *J. G. Lemmon*. (Herb. Columbia Coll.)

* * Leaves very narrowly linear, commonly acerose and often rigid and pungent; western species.

+ Sepals broadly ovate, obtusish, sometimes apiculate: flowers not densely aggregated.

A. capillaris, Poir. Leaves chiefly grouped at the base in fascicles upon a multicipital caudex, $\frac{1}{2}$–$2\frac{1}{2}$ inches long, somewhat pungent, little spreading; the cauline few pairs, much reduced: stems 4–8 inches in height: petals obovate, considerably exceeding the short obtuse sepals. — Poir. in Lam. Encycl. vi. 380; Regel, Ost-Sib. i. 366. *Alsine nardifolia*, Anderson, Cat. 118. The typical glabrous form with straight leaves is comparatively rare in America but occasionally occurs with var. NARDIFOLIA, Regel, l. c. i. 372, which is glabrous with curved leaves (*A. nardifolia*, Ledeb. Fl. Alt. ii. 166, & Icon. Fl. Ross. 6; Hook. Fl. Bor.-Am. i. 98, t. 32), and the more common form var. FORMOSA, Regel, l. c. i. 371, which has the stem and inflorescence glandular. (*A. formosa*, Fischer in DC. Prodr. i. 402; Hook. f. Arc. Pl. 287, 322; Torr. Bot. Wilkes Exp. 243.) — Central California to Utah, Montana, and British Columbia. (Asia.)

A. ursina. Root stout, ligneous: caudex very densely multicipital and bearing very close fascicles or rosettes of very short filiform-linear thickish glaucous glandular-ciliolate white-punctate apiculate leaves (but 2–3 lines in. length): stems few, erect, branched, slender, finely glandular-pubescent, $1\frac{1}{2}$–3 inches high, bearing one or two pairs of short distant spreading and rather rigid leaves: sepals nerveless: petals white, oblong, slightly emarginate: alternate filaments glanduliferous at the base: mature capsule considerably exceeding the calyx, about 6-seeded. — Dry hills, Bear Valley, San Bernardino Mts., *S. B. & W. F. Parish*, August, 1882. This species has much the habit of *A. compacta*, Coville, but much more obtuse sepals; it is most nearly related to *A. capillaris*, Poir., but differs in its condensed habit and in a waxy punctation of the leaves.

A. aculeata, Wats. Leaves grouped chiefly in fascicles at the summits of a multicipital caudex, decidedly glaucous, rigid and pungent and with age strongly spreading, 6–12 lines in length; cauline leaves few, shorter: stems simple up to the few-flowered cymes, 4–6 inches high: petals rather narrow, elliptic-oblanceolate, obtuse, $1\frac{1}{2}$–2 times as long as the sepals. — Bot. King Exp. 40, & Bibl. Index, 94. — Chiefly in mountainous districts from Oregon (*Nevius*, *Cusick*, *Howell*) to N. Nevada (*Watson*), S. Utah, and Arizona (?). The sepals are variable and become more acute in the southern form, which is more difficult to distinguish from those varieties of *A. congesta* which have an open inflorescence.

+ + Sepals ovate, or ovate-lanceolate, acuminate, shorter than the petals (except in *A. macradenia*, var. *Parishiorum*).

A. compacta, Coville. Root thick, ligneous: caudex much branched and bearing very closely tufted rosulately spreading subulate glaucous leaves; the latter not exceeding 2 lines in length, minutely glandular, ciliate: stems slender, an inch or more in height, simple or sparingly branched, almost naked, the cauline leaves being few and much reduced: flowers terminal on the branches: sepals $1\frac{1}{2}$ lines long, scarious-margined, thickened in the middle, attenuate. — Proc. Biol. Soc. Wash. vii. 67; Contrib. U. S. Nat. Herb. iv. 70, t. v. — Mountains of Tulare Co., Calif., *Coville*, August, 1891.

A. congesta, Nutt. Smooth, or more rarely glandular-pubescent: stems slender, simple, 5–14 inches high, numerous, springing from a matted non-ligneous caudex: basal leaves gramineous-setaceous, $\frac{1}{2}$–3 inches long, ciliolate-serrate near the base: cauline leaves rather distant, gradually reduced: flowers sessile or shortly and unequally pedicelled in 1–3 dense heads (subtended by 1–several pairs of scarious-margined bracts): sepals carinate, obscurely 3-nerved, membranous-margined, 2 lines long, considerably exceeded by the narrowly oblong petals: stigmas not strictly capitate. — Nutt. in Torr. & Gray, Fl. i. 178; Torr. Frem. Rep. 87; Wats. Bot. King Exp. 39; Porter & Coulter, Fl. Col. 13; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 123 (excl. syn.); Mrs. Brandegee, Zoe, ii. 161. — Rocky Mts. of Colorado and Wyoming to the Yosemite (acc. *Mrs. Brandegee*) and northward to Washington, *Suksdorf.*

Var. suffrutescens. Caudex sometimes, perhaps always, very ligneous; its branches becoming 2–3 lines in diameter, bearing fascicled sub-equal leaves (an inch or less in length): flowers somewhat smaller (sepals $1\frac{1}{2}$ lines long) in spherical capitate umbels: pedicels slender, 2–3 times as long as the calyx: stigmas capitate. — *Brewerina suffrutescens*, Gray, Proc. Am. Acad. viii. 620, under *A. congesta;* Brew. & Wats. Bot. Calif. i. 69; Wats. Bibl. Index, 95; Greene, Fl. Francis. 123. — California, Cisco, *Bolander & Kellogg;* Emigrant Gap, *Jones;* Tulare Co., *Coville & Funston*, 1504. A form too well marked in its foliage, ligneous caudex, and allium-like inflorescence to be united with the typical *A. congesta*, yet appearing to intergrade with it. One of the transitional forms has been collected in Sierra Valley by *Lemmon.*

Var. subcongesta, Wats. Caudex more or less ligneous, stems smooth, glandular or pulverulent-pubescent, often knotted with enlarged nodes: flowers as in the type, but borne in more or less expanded di-

chotomous cymes: leaves varying greatly in length and texture. — Bot. Calif. i. 69; Bibl. Index, 454. *A. Fendleri*, var. *subcongesta*, Wats. Bot. King Exp. 40, & Pl. Wheeler, 6; Porter & Coulter, Fl. Col. 13; Rothr. Enum. Pl. Col. 35. *A. Fendleri*, var. *glabrescens*, Wats. Bot. King Exp. 40, & Bibl. Index, 95, differs only in its still looser inflorescence, and should doubtless be referred hither. — Rocky Mts. of Colorado and Arizona, *Newberry*, to British America, Cypress Hills, *Macoun*, westward to Oregon, *Howell*, and California, Sierra Co., *Lemmon*, Donner Pass, *Torrey*. These puzzling and inconstant forms are intermediate between this species and *A. capillaris*, *A. Fendleri*, and *A. macradenia*. From the last they scarcely differ save in their smaller flowers and slightly in the form of the petals.

A. macradenia, Wats. (revised). Glabrous or nearly so: rootstock more or less ligneous, extensively and irregularly branched: stems stout for the genus, 6–15 inches high, knotted with the enlarged nodes: leaves chiefly cauline, glaucous, rigid, pungent, $\frac{1}{2}$–2 inches long: flowers larger than in the related species, in an open cyme: sepals fleshy subcarinate, $2\frac{1}{2}$–$2\frac{3}{4}$ lines long, with membranous margins: petals considerably exserted, obovate or oblong with an obtusish sometimes auricled base: stamineal glands moderately developed: stigmas subcapitate. — Proc. Am. Acad. xvii. 367 in part. — S. California, Mohave River, *Palmer*, 41; Antelope Valley, *Oliver*; S. Utah, *Parry*, 20, *Palmer*; Arizona, *Palmer*; Mt. Agassiz, *Lemmon*. These plants with their exserted petals and ligneous caudices best represent Dr. Watson's species as described, Palmer's no. 41 being the first mentioned type.

Var. (?) Parishiorum. Smooth or minutely glandular-pubescent: caudex scarcely ligneous, densely multicipital: stems slender; nodes not conspicuously enlarged: leaves chiefly basal: petals narrowed at the base, shorter than or barely equalling the sepals, the latter fully 3 lines in length: stamineal glands very large. — *A. macradenia*, Wats. l. c. xvii. 367 in part. — Common on mountains bordering on the Mojave Desert, *S. B. & W. F. Parish*, no. 1330.

+ + + Sepals lanceolate to lance-linear, attenuate, equalling or exceeding the petals.

++ Flowers cymose, not densely aggregated.

A. Fendleri, Gray. Rather pale and glaucous, finely glandular-pubescent above: stems numerous, erect, leafly, 4–15 inches high, closely aggregated upon the summit of a thick root: basal leaves setaceous, gramineous, ciliolate or quite smooth, 2–4 inches in length, somewhat pungent; the cauline gradually shorter, connate and sheath-

ing at the base: the internodes an inch or two long: inflorescence dichotomous, few to many flowered: sepals attenuate, glandular, nearly equalling the obovate petals ($2\frac{1}{2}$–3 lines in length): capsule commonly a fourth shorter. — Pl. Fendl. 13; Torr. Pacif. R. Rep. iv. 69; Wats. Bot. King Exp. 40, exclusive of var. *glabrescens*; Porter & Coulter, Fl. Col. 13. — Chiefly in the Rocky Mts., but sometimes among the sage-brush of the plains. Nebraska, *Engelmann;* Colorado to New Mexico, *G. R. Vasey;* San Francisco Mts., Arizona, *Lemmon;* Los Angeles, Cal., *Nevin.* The var. DIFFUSA of Prof. Porter's Fl. Col. is a greener form from the Rocky Mts. of Colorado and Wyoming with a more lax and spreading inflorescence and often although not always larger flowers. It intergrades with the type, so that in herbarium specimens at least its separation is often unsatisfactory. A form collected by Prof. Porter in the Garden of the Gods, and possessing very small flowers (sepals $1\frac{1}{4}$–$1\frac{1}{2}$ lines in length) upon curved and spreading branches, is perhaps equally worthy of varietal distinction.

†† Flowers densely fascicled at the summit of the stem.

A. Franklinii, DOUGL. Caudex of numerous procumbent more or less elongated branches, covered with somewhat persistent dried leaves: stems quite smooth, erect, simple, 3–5 inches high, somewhat rigid but fragile, bearing 3–6 pairs of narrowly subulate pungent spreading smooth or ciliolate and minutely scabrous leaves (5–9 lines long): cymes dense, sub-involucrate: sepals elongated, attenuate, pungent with slightly spreading tips, 1-nerved, 4–6 lines long, distinctly exceeding the petals. — Hook. Fl. Bor.-Am. i. 101, t. 35; Torr. & Gray, Fl. i. 178; Torr. Bot. Wilkes Exp. 244. — Sandy soil, Oregon, *Douglas, Lyall, Howell, Nevius, Cusick;* Washington, *Suksdorf.* Specimens collected by *Douglas* at source of the Missouri may well have been the next species.

A. Hookeri, NUTT. Caudex densely multicipital: stems 1–4 inches high, pubescent: leaves shorter than in the last: flowers smaller and petals about equalling or slightly exceeding the sepals. — Nutt. in Torr. & Gray, Fl. i. 178. *A. Franklinii*, var. *minor*, Hook. & Arn. Bot. Beech. 326; Wats. Bibl. Index, 95; Coulter, Man. Rocky Mt. Bot. 35. *A. Franklinii*, Engelm. Trans. Am. Phil. Soc. n. ser. xii. 186; Coulter, l. c. 35 in great part; Hook. & Jackson, Index Kew. 179. — Rocky Mts., lat. 40°, *Nuttall;* Colorado, *Vasey;* Wyoming, *Hayden, Parry, Porter, Greene, Sheldon;* Plains of Green River, *Gray;* Nebraska, *Rydberg, Webber;* Montana, *Tweedy.* This species with much the habit of the preceding differs in its much denser caudex and constantly pubescent stem, as well as in the differences

indicated. The stem is terete even in a dried state, while the stems of *A. Franklinii* in drying become furrowed and angulate, as though slightly fleshy.

§ 5. ALSINE, Wahlenberg (as genus, not Linn.). Capsule ovoid, 3-valved; valves entire; seeds not strophiolate: matted perennials or delicate annuals, usually with narrow linear subulate or acerose leaves. — Fl. Lapp. 127; Fenzl in Ledeb. Fl. Ross. i. 341; Regel, Radde's Reisen in Ost-Sib. i. 337; Pax in Engl. & Prantl, Nat. Pflanzenf. iii. 1 b, 82.

* Palustrine perennial with weak elongated stems, narrow linear or lance-linear leaves and axillary long-peduncled flowers.

A. paludicola. Glabrous, flaccid: stems several, subsimple, procumbent, rooting at the lower joints, sulcate, shining, leafy throughout: leaves uniform, flat, 1-nerved, acute, spreading, $\frac{3}{4}$–$1\frac{1}{2}$ inches long, 1–3 lines in breadth, often punctate, somewhat connate, slightly scabrous upon the margins: peduncles solitary in the axils, 1–2 inches long, spreading or somewhat deflexed: sepals nerveless, not at all indurated, acutish about half the length of the obovate petals. — *A. palustris*, Wats. (not Gay). Bot. Calif. i. 70, & Bibl. Index, 97; Greene, Fl. Francis. 124; Mrs. Brandegee, Zoe, ii. 341. *Alsine palustris*, Kellogg, Proc. Calif. Acad. iii. 61. — Abundant in swamps about Fort Point near San Francisco, *Bolander*, *Kellogg & Harford;* also in swamps near San Bernardino, *Parish Bros.;* May to August.

* * Terrestrial annuals of the Atlantic Slope and Alleghany Mountains, rarely extending to the interior in the Southern States, essentially glabrous: sepals obtuse, soft in texture, scarcely or not at all nerved.

A. Grœnlandica, SPRENG. Somewhat fleshy: root at first simple, later of many delicate fibres: stems few to many, decumbent or erect, subsimple, 2–8 inches long, bearing 1–5 flowers: leaves linear, obtuse, $1\frac{1}{2}$–7 lines long, at first in a dense, more or less rosulate cluster at the base; the cauline 2–4 pairs: sepals broadly ovate, $1\frac{1}{2}$–2 lines in length: petals obovate, about twice as long, entire or notched: capsule subglobose to oblong, more or less contracted to a point. — Syst. ii. 402; Torr. & Gray, Fl. i. 180; Torr. Fl. N. Y. i. 95, t. 15. *A. glabra*, Torr. Fl. U. S. 455, not Michx.; Bigel. Fl. Bost. ed. 2, 180. *Alsine Grœnlandica*, Gray, Man. ed. 2, 58. *Stellaria Grœnlandica*, Retz. Fl. Scand. ed. 2, 107; Vahl, Fl. Dan. vii. t. 1210. ? *S. Labradorica*, Schrank, Pfl. Lab. 24; Meyer, Pl. Lab. 93. — Rocky soil, chiefly but not always at higher altitudes, Greenland to the coast of Maine, Bath, *Gambel;* Bar Harbor, *Rand;* also at Middletown, Conn., *Osborn*, *Wright;* locally abundant in the White, Green, Adirondack,

Catskill, and Shawangunk Mts.; reported from Kittatinny Mts. of N. W. New Jersey (*Britton*, Bull. Torr. Club, xi. 128), and recently found in the mountains of Pennsylvania (according to *Prof. Porter*), of S. Virginia (*Small & Heller*), and in N. Carolina (*Small*), where it had passed as a form of *A. glabra*, Michx., having been previously collected on Roan Mountain by *Gray & Carey*, *Smith*, and *Scribner*.*

A. glabra, Michx. Glabrous, loosely matted, many-stemmed: stems weak, slender, suberect, very leafy, 6–12 inches high: leaves narrowly linear, spreading, thin, nerveless, equalling or exceeding the internodes: peduncles filiform, elongated, spreading, 1-flowered: corolla rather broad, considerably exceeding the calyx: sepals ovate-oblong, obtuse, nerveless, $1\frac{1}{2}$ lines in length, somewhat exceeded by the ovoid capsule. — Fl. i. 274; Torr. & Gray, Fl. i. 180 in part. *Alsine glabra*, Gray, Man. ed. 2, 58; Chapm. Fl. 49. — On rocks in mountains of N. Carolina, *Michaux;* Table Mountain, *Gray;* Table Rock, S. Carolina, *Vasey;* Stone Mt., Ga., *Gray;* De Kalb Co., Ga., *Small;* also in the Arroyo of Lamben, near the Mexican boundary, *Parry*.

A. brevifolia, Nutt. Glabrous: stems erect, filiform, 2–5 inches high, with spreading branches: leaves linear or lance-linear obtuse, nerveless, slightly fleshy, 1–4 lines long, commonly much shorter than internodes: sepals ovate-oblong, obtuse, only a line in length, with a distinct thin white margin: petals rather conspicuous, obovate, $2\frac{1}{2}$–$3\frac{1}{2}$ lines in length, widely spreading: capsule ovoid, acuminate, a third longer than the calyx; valves ovate, acuminately narrowed almost to the tip. — Nutt. in Torr. & Gray, Fl. i. 180. *Alsine brevifolia*, Chapm. Fl. 49. — On rocks, Georgia, Tatnal County, *Nuttall;* Stone Mountain, *Canby*, *Gray*, *Small;* April, May. Apparently the most rare and local eastern species.

* * * Terrestrial annuals of the Pacific Slope: sepals neither indurated nor very strongly nerved.

– Seeds much flattened, and margined.

A. Douglasii, Torr. & Gray. Thinly glandular-pubescent and somewhat viscid, or nearly glabrous: stems much branched, 2–15 inches high: leaves attenuate to filiform points: peduncles filiform: flowers numerous, larger than in the related species, 4–5 lines in diameter: sepals ovate, thin-margined, obscurely or more or less distinctly ribbed: petals obovate, conspicuous · capsule subglobose; the valves rounded at the apex; seeds large, smooth, or with fine radiate

* For further discussion of this species see page 328.

striation, reniform, broadly margined. — Fl. i. 674; Durand, Pl. Pratt. 83; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 124. *A. verna*, β, Hook. & Arn. Bot. Beech. 325. *Greniera Douglasii*, Gay, Ann. Sci. Nat. ser. 3, iv. 27. *Alsine tenella*, Torr. Bot. Mex. Bound. 36 (ex char. et hab.). — Barren hillsides and grassy slopes, S. Arizona, *Palmer*, and S. California to Oregon, *Howell, Henderson;* some smaller flowered specimens with seeds of *A. Douglasii* have been collected by *Thurber* in San Diego, Calif.

+ + Seeds not flattened nor thin-margined.

A. Howellii, Wats. Finely glandular-pubescent: stem terete, purple, diffusely branched, more than a foot high: leaves rather thick, obtuse, 4–7 lines in length; the floral much reduced: flowers 2½–3 lines in diameter: petals oblong, little exceeding the ovate glandular nerveless sepals: capsule ovoid, pointed; valves narrowed to an acutish apex; seeds dark, slightly tuberculate-crested. — Proc. Am. Acad. xx. 354.

A. Californica, Brewer. Smooth: the delicate filiform stems branching from the base, erect, 2–4 inches in height: leaves very short, slightly fleshy, 1–2 lines in length, obtuse: flowers 4 lines in diameter: petals oblong, about twice the length of the ovate-oblong nerveless or inconspicuously ribbed sepals: seeds small, finely roughened. — Brewer in Boland. Cat. 6; Brew. & Wats. Bot. Calif. i. 69; Greene, Fl. Francis. 124. *A. brevifolia*, var. (?) *Californica*, Gray, Proc. Calif. Acad. iii. 101. — Dry hills, sandy soil. Central Calif. to Grant's Pass, Oregon, *Howell.*

A. pusilla, Wats. Smooth, very diminutive, 1½–2 inches high: stems purplish, filiform, branched from the base: leaves obtusish, but 1–2 lines in length: sepals not so strongly nerved as in the preceding, 1–1¼ lines in length: petals minute or wanting: seeds minute, smooth. — Proc. Am. Acad. xvii. 367. *A. Californica* of Bot. Calif. (in part). — Plains about Yreka, Calif. (*Greene*), to the Dalles of the Columbia (*Howell Bros.*), and White Salmon, Wash. (*Suksdorf*).

* * * * Annuals or slender-stemmed loosely matted perennials, 5–15 inches in height: sepals lanceolate, acuminate or attenuate, strongly 3–5-nerved.

+ Puberulent.

A. tenella, Nutt. Finely glandular-pubescent: stems very slender, dichotomously branched almost from the base, 3–8 inches in height: leaves attenuate from a connate prominently ribbed base to a filiform often curved apex, 3–5 lines long; the uppermost considerably reduced: pedicels filiform, several times as long as the strongly

3-ribbed sepals; the latter equalled or more or less exceeded by the oblong petals: valves of ovoid capsule exceeding the sepals; seeds small, margined with a fine muriculate crest (under a strong lens). — Nutt. in Torr. & Gray, Fl. i. 179; Eaton & Wright, N. A. Bot. 133 (excl. Arkansas spec.); Macoun, Bot. Gaz. xvi. 286. *A. tenuifolia*, var. *Americana*, Fenzl ex Torr. & Gray, Fl. i. 674. *Greniera tenella*, Gay, Ann. Sci. Nat., ser. 3, iv. 27. *Alsine tenella*, Torr. Bot. Wilkes Exp. 243. — Rocky places, flowering in midsummer; Oregon, *Nuttall*, *Tolmie*, *Hall*, *Howell*, to British Columbia, Kamloops acc. to *Macoun;* Nanaimo, *Miss Cooley*. Like *A. Grœnlandica* of the Eastern States, this species seems to occur either in mats or in a segregated state. In the former condition it considerably resembles *A. stricta*, Michx., but is to be distinguished by its small flowers and puberulent inflorescence. It differs from *A. patula* in its broadly elliptic petals not at all truncate or retuse.

A. patula, Michx. Stem diffusely branched, 2 inches to a foot in height, often almost filiform: leaves spreading, slightly fleshy: inflorescence dichotomous; pedicels filiform, spreading: sepals lanceolate, attenuate, with 3–5 prominent converging nerves, slightly indurated, a little over 2 lines in length, usually minutely glandular: petals twice as long, entire or retuse, obcordate: the obtuse valves of the capsule about equalling the calyx; seeds black, minutely roughened. — Fl. i. 273; Torr. & Gray, Fl. i. 180; Gray, Man. ed. 5, 91; Hill, Bull. Torr. Club, xvii. 172; Macmillan, Bot. Gaz. xv. 332. *A. Pitcheri*, Nutt., and (?) *A. tenella*, Nutt. in Torr. & Gray, l. c., so far as Arkansas plants are concerned. *Alsine microsperma*, Fenzl ex Torr. & Gray, Fl. i. 674. *A. patula*, Gray, Man. ed. 2, 58; Chapm. Fl. 49. *A. Pitcheri*, Wood, Class-Book, 260; Chapm. Fl. (Suppl.) 608. *Stellaria macropetala*, Torr. & Gray, Fl. i. 184 (*Alsine macropetala*, Gray, Gen. ii. 34), differing only in the slightly more deeply divided petals, which are themselves more or less variable, must be referred hither, where its identity of habit and calyx clearly indicates its affinity to be. — Kentucky to Alabama (*Peters*, *Mohr*) and Texas (*Drummond*, *Meyer*, *Buckley*), northward to Chicago (*Babcock*, *Hill*) and Cass Co., Minnesota (acc. to *Macmillan*). The leaves of this species are variable, commonly narrowly linear or filiform, 4–7 lines in length, but they occasionally become 1½ inches long and a line wide.

\+ \+ Glabrous.

A. stricta, Michx. Smooth, loosely matted: stems very numerous, slender, ascending, 3–15 inches high, leafy nearly to the middle: leaves subulate-setaceous, conspicuously fascicled in the axils: inflo-

rescence a loosely forked cymose panicle: petals narrowly obovate, nearly twice the length of the somewhat rigid acuminate prominently 3-ribbed sepals: capsule about equalling or exceeding the calyx. — Fl. i. 274; Ell. Sk. i. 521; Hook, Fl. Bor.-Am. i. 99, t. 33 (including both var. *α*, a weak boreal few-flowered form with erect leaves, and var. *β*, the common form with spreading leaves); Torr. & Gray, Fl. i. 179, var. *β*; Britton, Mem. Torr. Club, ii. 37. ? *A. setacea*, Muhl. Ind. Fl. Lanc. 169. *A. Michauxii*, Hook. f. Arc. Pl. 287, 322. *Alsine Michauxii*, Fenzl, Verbr. Alsin. 18; Regel, Ost-Sib. i. 351, t. 8, f. 1–5. — Rocky and gravelly soil, Vermont to S. Carolina, westward to Minnesota.

Var. Texana. More rigid, stems fewer, 3–7 inches high, strongly enlarged at the nodes: leaves very short, conspicuously connate; the fascicled ones but 1–2 lines long: flowers in a small rather dense cyme: sepals almost cartilaginous, very strongly 3-nerved, appearing attenuate through the infolding of their margins. — ? *A. stricta*, var. α, Torr. & Gray, Fl. i. 179. — Rocky Hills, Texas; along the Canadian River, *Gordon*, April, 1848; *Bigelow*, August, 1853; Dallas, *Hall*, July, 1872: Comanche Peak, *Reverchon*. 1881; Arkansas, *Leavenworth;* False Washita, Ind. Ter., *Palmer;* Kansas, Norton, *Smith*. Owing to its definite and limited geographic range this variety may, as Dr. Britton suggests, prove worthy of specific rank. The characters, however, are not very definite, and a specimen from Potosi, Mo. (*F. Peck*) exactly connects it with the type. While the description of Torrey and Gray's var. *α*, cited above, ill accords with the present plant and rather suggests that these authors intended their var. *α* to be equivalent to the var. *α* of Hooker, as their var. *β* was of his var. *β*, yet in the Columbia Herbarium there are specimens of the southwestern plant labelled in Torrey's hand as var. *α*. If the Texan plant was the var. *α* of Torrey and Gray, it need scarcely be said that it could not have been the typical form of Michaux's species, as it was doubtless intended to be.

* * * * * Perennials, closely matted or tufted, 1–6 inches in height: sepals acuminate, but not strongly nerved, except in *A. verna*.

A. verna, L. Rather closely tufted: stems numerous, slender, ascending or erect, smooth, 1–5 inches high, 1 to 3 (or more) flowered; the upper internodes commonly considerably exceeding the leaves: leaves linear-subulate, flat, rather strongly 3-nerved, usually erect and never squarrose: peduncles filiform: sepals ovate-oblong, acutish to acuminate, strongly 3-nerved, $1\frac{1}{2}$–$1\frac{3}{4}$ lines long, exceeding the obovate or oblanceolate obtusish petals: capsule somewhat surpassing the

calyx. — Mant. i. 72; Seringe in DC. Prodr. i. 405; Hook. Fl. Bor.-Am. i. 99; Torr. & Gray, Fl. i. 181. *A. juniperina*, Pursh, Fl. 318; Hook. Fl. Bor.-Am. i. 98; Torr. & Gray, Fl. i. 179, 674. *Alsine verna*, Bartl. Beitr. ii. 63. — A widely distributed species with numerous but ill defined varieties. The smooth typical form appears to be common in the Rocky Mts. of British America (*Macoun*), and has been found on Mt. Albert, Lower Can. (*Allen*). A far more frequent form is

Var. hirta, Wats. Finely glandular-puberulent upon stems, peduncles, and calyx: leaves nearly or quite smooth. — Bot. King Exp. 41; Porter & Coulter, Fl. Col. 14; Rothr. Enum. Pl. Col. 35. *A. hirta*, Wormsk. Fl. Dan. x. t. 1646. *A. propinqua*, Richardson in Frankl. Journ. 738. *Alsine verna*, var. *hirta*, Fenzl in Ledeb. Fl. Ross. i. 349. *A. rubella*, var. *hirta*, Lange, Pl. Grœnl. 132. *A. propinqua*, Lange, Fl. Dan. xvii. t. 2903. *A. hirta*, Warming, Bot. Foren. Festskr. 1890, 229. — From Greenland to Alaska, southward to Smugglers' Notch, Vt. (*Pringle*), and along the Rocky Mts. to Arizona (*Lemmon*); also in the San Bernardino Mts. (*Wright*).

Var. rubella, Hook. f. Depauperate, minutely glandular-puberulent or very rarely smooth: peduncles and sepals purplish tinged, the latter less strongly nerved. — Journ. Linn. Soc. v. 82. *A. Giesekii*, Hornem. Fl. Dan. ix. t. 1518. *A. hirta*, var. *glabrata*, Cham. & Schlecht. Linnæa, i. 56. *Alsine rubella*, Schrenk in Fenzl, l. c. i. 349. *A. verna*, var. *glacialis*, Fenzl fide Wats. Bibl. Index, 99. — Occurring with and often scarcely to be distinguished from the preceding.

A. Rossii, Richardson. Dwarf and closely tufted, glabrous: leaves crowded, narrowly linear, 3-edged, obtusish, slightly fleshy: stems many, $\frac{1}{2}$–$1\frac{1}{2}$ inches long, filiform, usually ending in a solitary peduncle, more rarely branched and several-flowered: sepals attenuate, slightly fleshy, not at all rigid and scarcely or not at all ribbed, 1–$1\frac{1}{2}$ lines long: petals oblong, nearly equalling the calyx, often minute or none: capsule shorter than the calyx. — Richardson in Frankl. Journ. 738; R. Br. in Parry's 1st Voy. App. 272; Hook. Fl. Bor.-Am. i. 100; Torr. & Gray, Fl. i. 181; Porter & Coulter, Fl. Col. 14. *A. elegans*, Cham. & Schlecht. Linnæa, i. 57. *A. stricta*, Wats. Bibl. Index, 98, in part, not of Michaux nor Wahlenberg's *Alsine stricta* of the Old World, which is surely distinct. *Alsine Rossii*, Fenzl, Verbr. Alsin. 18. — Mountains of Colorado, *Hall & Harbour*, *Coulter*, *Wolf*; Wyoming, *Parry*; British America. *Bourgeau*, to Arctic America.

A. Nuttalli, Pax. Glandular-puberulent or tomentulose throughout: root single, vertical, rather stout: stems many, loosely matted and much branched near the base; branches ascending or erect, leafy:

leaves subulate-acerose, rigid, pungent, tending to be squarrosely spreading, connate, 3–4 lines long: flowers usually numerous in spreading cymes, rarely subsolitary: sepals attenuate, acuminate, often purplish, not strongly nerved, 2–2½ lines long, exceeding the more or less pointed petals and ovoid capsule. — Pax in Engler, Jahresb. xviii. 30. *A. pungens*, Nutt. in Torr. & Gray, Fl. i. 179 (not of Clem.); Wats. Bot. King Exp. 40. — Rocky Mts. from Wyoming to S. British America, westward in mountainous regions to Washington and S. California.

Var. gracilis. Sepals narrow, elongated and still more attenuate, 2½–3 lines long: leaves less rigid, scarcely spreading or pungent. — *A. pungens*, var. *gracilis*, Gray in herb. — California Mts. above Big Tree Grove, *Bolander*, 4976; Long Meadow, Tulare Co., *Palmer*, *Coville & Funston*. Intergrading with the typical form.

* * * * * * Densely cespitose perennials with acicular or awl-shaped leaves: sepals oblong, or linear-oblong, very obtuse.

+ Alpine, boreal or arctic species.

++ Petals oblong or narrowly obovate.

A. Sajanensis, Willd. Cespitose: stems finely but rather densely glandular-hirsute, decumbent, very leafy below and with age sheathed at the base with the dried persistent leaves; the upper more or less erect portion of the stems ½–2½ inches in length, bearing two or three pairs of short and rather distant more or less puberulent leaves, and terminating in 1 to 3 flowers; lower leaves linear, obtusish, rather rigid, erect, 2–3½ lines long, quite glabrous or ciliolate, less commonly glandular-pubescent, straight: segments of the calyx linear-oblong, 1–3-ribbed, glandular-pubescent, 2 lines in length: petals spatulate, equalling or half exceeding the sepals, rarely nearly twice as long (but narrower than in *A. arctica*): valves of the capsule linear-oblong, obtuse, often considerably exceeding the calyx. — Willd. in Schlecht. Berl. Mag. Natf. 1816, 200; DC. Prodr. i. 408. *A. thymifolia*, James. Cat. 181. *A. obtusa*, Torr. Ann. N. Y. Lyc. ii. 170. *A. biflora*, Wats. Bibl. Index, 94, not of Linn. *A. arctica*, and vars. of various authors, not of Stev. *Stellaria biflora*, L. Spec. 422. *Alsine biflora*, Wahlenb. Fl. Lappon. 128; Fenzl in Ledeb. Fl. Ross. i. 355. — Mt. Albert, Lower Can., *Allen*, *Macoun*, to Labrador and Behring Strait, southward to Oregon, *Cusick*, and along the Rocky Mountains to New Mexico, *Parry*, and Arizona, *Lemmon*. (Greenland and Siberia.) A common species widely distributed in alpine and arctic regions of the Old and New World. Its confluent varieties and forms seem largely due to individual environment. The follow-

ing only need be mentioned: var. RIGIDULA (*Alsine biflora*, var. *rigidula*, Fenzl, l. c.), with leaves erect, firm in texture and rather closely imbricated; and var. CARNOSULA (*Alsine biflora*, var. *carnosula*, Fenzl, l. c.), more flaccid, with leaves spreading and slightly fleshy.

? A. laricifolia, L. Slightly woody and much branched at the base: stems clothed with linear acicular secund ciliolate-denticulate leaves: fertile branches erect, simple, 4–7 inches in height, 2–5-flowered: sepals $3\frac{1}{2}$ lines in length, linear-oblong, 3-nerved: petals oblong or narrowly obovate, entire, twice as long as the calyx. — Spec. 424. — An alpine European species at various times reported from Alaska but still somewhat doubtful. Plants recently collected upon the Porcupine River by *J. H. Turner* certainly possess much resemblance to the European plant, but differ in their shorter sepals and less leafy stems. It is not unlikely that they may prove merely a tall and long-petalled form of the preceding polymorphous species.

++ ++ Petals broadly obovate, much exceeding the calyx: Alaskan.

A. arctica, STEV. Stems 1–3 inches long, glandular-pubescent: lower leaves narrow, linear, obtuse, slightly fleshy, crowded upon the bases of the stems, nearly or quite glabrous, sometimes slightly ciliated near the base, half a line in breadth; the upper leaves a little broader, and more or less distant: flowers solitary, terminal upon slender glandular-pubescent peduncles, 5–7 lines in diameter: capsule $3\frac{1}{2}$–4 lines long, considerably exceeding the sepals: seeds minutely roughened and slightly crested. — Stev. in DC. Prodr. i. 404; Cham. & Schlecht. Linnæa, i. 54; Hook. Fl. Bor.-Am. i. 100 (excl. vars.); Torr. & Gray, Fl. i. 181 in part. *Alsine arctica*, Fenzl, Verbreit. Alsin. 18, & Ledeb. Fl. Ross. i. 355; Regel, Ost-Sib. i. 338, 346 (excl. var. breviscapa). — Western and Northern Alaska and adjacent islands.

A. macrocarpa, PURSH. Stems 2–4 inches long, covered except near the ends with the densely imbricated lance-linear obtuse conspicuously ciliated leaves; the latter $\frac{3}{4}$ of a line broad: flowers solitary, terminal, often exceeding $\frac{1}{2}$ inch in diameter: valves of the mature capsule fully 6 lines in length; seeds slightly margined. — Fl. 318; Cham. & Schlecht. Linnæa, i. 55; Hook. Fl. Bor.-Am. i. 101; Torr. & Gray, Fl. i. 182, 675. *A. arctica*, var. β, *grandiflora*, Hook. Fl. Bor.-Am. i. 100, t. 34, f. B. *Alsine macrocarpa*, Fenzl, Verbreit. Alsin. 18; Regel, Ost-Sib. i. 354, t. 8, f. 6–9; *A. arctica*, var. *breviscapa*, Regel, l. c. i. 347. Regel's elaborate subdivision of the Siberian forms of this species is not warranted in America in the absence of abundant fruiting material. — Western Alaska near the coast. (Siberia.)

+ + Species of the Atlantic and Gulf States, neither arctic nor alpine.

A. Caroliniana, Walt. Stems several to many, glandular-pubescent and viscid above. 3–8 inches in height, densely leafy near the base: leaves linear-subulate, rigidulous, pungent, triangular in section, channelled above; the lower imbricated and more or less squarrosely spreading; the upper reduced, distant: cymes few-flowered; pedicels slender, ascending: sepals oval, $1\frac{1}{2}$ lines in length: petals broad, rounded at the apex. — Car. 141; Wats. & Coulter in Gray, Man. ed. 6, 85. *A. squarrosa*, Michx. Fl. i. 273; Ell. Sk. i. 520; Torr. Fl. N. Y. i. 95. *A. imbricata*, Raf. in Desv. Journ. Bot. (1808), i. 229. *A. Rafinesquiana*, Seringe in DC. Prodr. i. 409. *Alsine squarrosa*, Fenzl ex Gray, Man. ed. 2, 57; Gray, Gen. ii. 34, t. 111; Chapm. Fl. 49. — Pine barrens, S. New York to Florida.

12. SAGINA, L. Pearlwort. (Name from the Latin *saginare*, to fatten; the plants though small and delicate sometimes grow abundantly in otherwise barren regions and are grazed by cattle.) Low slender herbs commonly cespitose with filiform stems and subulate or filiform leaves; about a dozen species inhabiting the temperate and frigid parts of the northern hemisphere; one being also widely distributed in the southern hemisphere. — Gen. n. 336; DC. Prodr. i. 389; Gray, Gen. ii. t. 109.

* Very slender, 2–5 inches high: the almost capillary stems several to many, subsimple from near the base, usually several-flowered: the lowest flowers distinctly axillary: leaves nearly filiform but flattened above, not proliferous in the upper axils nor forming sterile lateral rosettes; the basal rosette seldom persisting: flowers very small, 4- or 5-parted.

S. apetala, L. Very slender and commonly glandular-pubescent: stems not numerous, procumbent or nearly erect: leaves very slender, $1\frac{1}{2}$–3 or 4 lines in length, scarcely flat: pedicels straight; flowers normally 4-parted; petals obovate. — Mant. ed. 2, 559; Fenzl in Ledeb. Fl. Ross. i. 338; Torr. & Gray, Fl. i. 177. *S. procumbens*, var., Benth. Brit. Fl. 120. — Labrador, *Allen*, to Pennsylvania, infrequent but locally abundant in dry situations. A form with elongated capillary stems is abundant in grassy situations near Hewitt's, Bergen Co., N. J., *Britton*. Introduced at Auburn, California, *Mrs. Ames*. *Alsinella ciliata*, Greene, which is ambiguously characterized in the Flora Francis. 126, as a very slender and diffuse plant of compact habit, does not differ in its described characters from this species.

S. decumbens, Torr. & Gray. Annual, quite smooth or the younger parts slightly glandular: stems several, decumbent or sub-

erect, 2–5 inches high, subsimple: the filiform straight peduncles exceeding the narrowly linear very acute leaves: flowers normally 5-parted: calyx appressed even in fruit, obtusish but not rounded at the base, ⅔ the length of the capsule valves: petals scarcely equalling the sepals: stamens 10. — Fl. i. 177. *S. procumbens*, Pursh. Fl. 119. *S. Elliottii*, Fenzl ex Gray, Man. ed. 2, 61. *S. subulata*, Torr. & Gray, Fl. i. 178, not of Wimm. ? *Spergula nodosa*, Walt. Car. 142. *S. saginoides*, Michx. Fl. i. 276, not of Linn. *S. decumbens*, Ell. Sk. i. 523. *S. subulata*, Hook. Fl. Bor.-Am. i. 93. — New England to Great Plains of British America (*Macoun*), southward to Florida and Texas; on dry, sandy ground.

Var. Smithii, Wats. More slender: flowers apetalous, at least all the later ones. — Bibl. Index, 105; Wats. & Coulter in Gray, Man. ed. 6, 89. *S. subulata*, var. *Smithii*, Gray, Man. ed. 5, 95. Unsatisfactorily distinguished from *S. apetala* by its 5-parted flowers.

S. occidentalis, Wats. Annual, glabrous, with habit and foliage of the preceding species but with longer pedicels (usually 7–10 or 12 lines) and larger also 5-parted flowers: capsule 1¾ lines in length: calyx rounded at the base. — Proc. Am. Acad. x. 344. *S. procumbens*, Boland. Cat. 6; Torr. Bot. Wilkes Exp. 242? *S. Linnæi*, Gray, Proc. Am. Acad. viii. 378. *Alsinella occidentalis*, Greene, Fl. Francis. 125. — Vancouver's Island to Southern California, low grounds and salt marshes of the coast. The western equivalent of *S. decumbens*, possibly intergrading with that species.

S. procumbens, L. Matted: the numerous procumbent leafy stems 1½–4 inches in length: leaves smooth or ciliate, narrowly linear, obtusish and mucronate: pedicels filiform elongated, nodding at the summit during anthesis: flowers normally 4-parted: petals considerably shorter than the sepals; the latter spreading in fruit. — Spec. 128; Torr. & Gray, Fl. i. 177. — Moist rocks, also in paths, etc., Nova Scotia to Pennsylvania, also rarely inland as far as Michigan, *Hill;* flowering through the summer. (Eu., Asia, S. Amer.) Apetalous forms have been noted in the Old World.

* * Stems very short, ½–2 inches long; flowers rather small, 5-parted, terminal: leaves thickish, narrowly linear to subulate, not proliferous in the upper axils but almost always forming lateral sterile rosettes about the base.

S. Linnæi, Presl. Matted, 1–3 inches high: stems slender, decumbent, rooting and often producing lateral rosettes: radical leaves narrowly linear, acutely mucronate, 3–7 lines long, forming dense and mostly persistent rosettes; cauline leaves short, few: pedicels long, filiform, commonly recurved at the summit: flowers moderately large

for the genus: petals not quite equalling the calyx: capsule ovate, conic, even before dehiscence considerably exceeding the sepals; the dry valves fully twice their length: stamens 5–10. — Rel. Haenk. ii. 14; Fenzl in Ledeb. Fl. Ross. i. 339; Wats. Bot. King Exp. 41. *S. saxatilis*, Wimm. in Lange, Pl. Grœnl. 133. *Spergula saginoides*, L. Spec. 441. *Alsinella saginoides*, Greene, Fl. Francis. 125. — Labrador, *Allen*, to Greenland, Alaska southward along the Rocky Mts. to New Mexico; also in Mariposa Co., Calif., *Congdon*.

S. nivalis, Lindbl. Very condensed, $\frac{1}{2}$–1 inch high: leaves subulate, or linear subulate, 2–3 (rarely 5) lines long, forming one or more dense rosettes; cauline leaves few and short: pedicels spreading, 5 lines in length, straight or curved but scarcely ever hooked at the summit: petals equalling the purple edged sepals, about a line in length. — Bot. Not. 1845, 66; Hook. f. Arc. Pl. 287, 322; Babington, Seem. Journ. Bot. ii. 340; Wats. Bot. King Exp. 42. *S. intermedia*, Fenzl, l. c. i. 339. *Arenaria cæspitosa*, Vahl, Fl. Danica, xiii. t. 2289. — A rare plant, first collected in America by Dr. Watson in the Uinta Mts. in 1869 (Herb. Dep't of Agric.); since found in Alaska, without the exact locality, *Dall;* Kyska Harbor, *Harrington;* and also in the Rocky Mts. of Colorado near Gray's Peak, *Patterson*. The species has been regarded by some authors, and perhaps rightly, as a boreal or high alpine form of the preceding.

* * * Distinctly fleshy: stems not filiform, more or less branched, several-flowered: flowers 5-parted: species of the Pacific coast.

S. crassicaulis, Wats. Smooth: stems several or many, branching, $1\frac{1}{2}$–5 inches long: leaves linear, pungent, thickish, $2\frac{1}{2}$–7 (rarely 12) lines long; the basal forming a rosette which may persist or not; the cauline connate by broad scarious membranes: pedicels numerous, straight: petals and sepals subequal, $1\frac{1}{2}$ lines in length: capsule $\frac{1}{3}$–$\frac{1}{2}$ longer. — Proc. Am. Acad. xviii. 191. *Alsinella crassicaulis*, Greene, Fl. Francis. 125. — Beaches of Pacific coast, Marin Co., Calif., *Congdon;* Monterey Co., *Michener & Bioletti;* Ilwaco, Washington, *Henderson*. Distinguished from the Japanese *S. maxima*, Gray, by its glabrous peduncles and calyx.

* * * * Stems simple, 2–6 inches in length; upper leaves short, proliferous, i. e. bearing fascicles of minute leaves in their axils: flowers 5-parted: petals exceeding the calyx: species of the Atlantic Slope and Great Lakes.

S. nodosa, Fenzl. Perennial: stems several to many, decumbent, rooting at the base, often 5–6 inches in length: lower leaves filiform; the upper subulate, only a line in length, bearing a tuft of undeveloped leaves in the axils, thus giving a nodose appearance to

the slender stems: flowers terminal, large for the genus, 4 lines in diameter when expanded. — Verbr. Alsin. t. 18, & Ledeb. Fl. Ross. i. 340. *Spergula nodosa*, L. Spec. 440. — Moist sandy soil. Coast of Maine south to Cape Ann, *J. Robinson*; also on both shores of Lake Superior and northward to Hudson Bay.

13. SPERGULARIA, Pers. (Name, a derivative of *Spergula*.) Annuals or perennials, usually of maritime and saline habitat, with narrowly linear, often fleshy leaves. A genus of moderate size but difficult, through the natural variability of certain species, the inconstancy of characters (such as the form of the seeds) which elsewhere are most trustworthy, and finally through an unfortunate complication in the synonymy, arising both from the most diverse views as to the number and proper limitation of the species and from the differences in the choice of the generic name. Space does not here permit any complete discussion of the last point. It may, however, be said that the name *Spergularia* is the only one which has ever attained a wide use, having been employed in such excellent popular manuals as Hooker & Bentham's Handb. Brit. Fl., Hooker's Fl. Brit. Isl., Garcke's Fl. Deutsch., Gray's Man., eds. 1–5, Cosson & Germain's Synop. Analyt., etc. Beside this matter of popular usage of the past, there is at present the best authority for selecting this name, since it is the one retained by the Kew botanists, and is advocated in the Berlin recommendations. On the other hand, the more radical reformers of nomenclature have attained no unanimity in regard to the proper name for the genus; Professors Baillon, Greene, and Britton adopting *Tissa*, Dr. Kuntze *Buda*, and Mr. N. E. Brown *Corion*, while Prof. Pax, who in his Monograph of the Caryophyllaceæ in Engler & Prantl's Nat. Pflanzenf. used *Tissa*, in a later publication has returned to *Spergularia*. — Syn. i. 504; Gray, Gen. ii. 27, t. 108; Benth. & Hook. Gen. i. 152. *Arenaria*, L. Gen. n. 374 in part. *Corion*, Mitchell, Act. Phys. Med. Acad. Nat. Cur. viii. App. 218, fide Britton in Britten's Journ. of Bot. xxix. 303; N. E. Brown, Suppl. Eng. Bot. *Tissa*, Adans. Fam. des Pl. ii. 507; Baillon, Hist. des Pl. ix. 116; Britton, Bull. Torr. Club, xvi. 125; Greene, Fl. Francis. 126, & Man. Bay Reg. 35. *Buda*, Adans. l. c. i. 507; Dumort. Fl. Belg. 110; Wats. & Coulter in Gray, Man. ed. 6, 89. *Lepigonum*, Fries, Fl. Hall. 76; Kindberg, Monogr.; Wats. Bibl. Ind. 103.

* Procumbent, or decumbent, slender, scarcely at all fleshy, growing near or even on the seacoast, but not truly saline: flowers small or of medium size: petals magenta: stipules lanceolate, elongated and conspicuous.

S. rubra, Presl. Usually annual, smoothish below, finely glandular-pubescent above: stems spreading, wiry: leaves flat above, nar-

rowly linear, cuspidate, 4–6 lines long, $\frac{1}{3}$–$\frac{1}{2}$ line broad: stipules white, attenuate, 2–3 lines long: inflorescence racemiform; pedicels truly filiform, exceeding the bracts and about twice as long as the oblong-lanceolate scarious-margined acutish glandular-pubescent sepals: corolla $1\frac{1}{2}$ lines in diameter, scarcely equalling the calyx: capsule of the same length; seeds "semiobovate" and minutely crested but not winged. — Rel. Haenk. ii. 9; Gray, Gen. ii. 28, t. 108, & Man. ed. 1, 64 excl. var. *S. rubra*, var. *campestris*, Gray, Man. ed. 5, 95. *S. campestris*, Aschers. ex Rohrb. in Mart. Fl. Bras. xiv.^{2} 267. *Arenaria rubra*, L. Spec. 423 excl. var.; Bigel. Fl. Bost. 108; Hook. Fl. Bor.-Am. i. 98. *Buda rubra*, Dumort. Fl. Belg. 110. *Spergula rubra*, Torr. & Gray, Fl. i. 175 excl. vars. *Tissa rubra*, Britt. Bull. Torr. Club, xvi. 127. — An attractive species, growing about paths in dry sandy soil. Maine to Virginia, and Washington State, *Suksdorf;* to San Francisco, *Mrs. Brandegee.* (Europe.)

S. Clevelandi. Perennial, viscid-glandular: leaves ascending, often secund, conspicuously fascicled in the axils, almost terete and filiform, very acute and attenuate, 5–10 lines in length: flowers much as in the last, but often somewhat larger: seeds winged. — *Tissa villosa*, Britton, l. c. xvi. 129. *T. Clevelandi*, Greene, Fl. Francis. 127. *T. rubra*, K. Brandegee, Zoe, iv. 84. — Sandy soil, California, San Diego, *Cleveland, Mrs. Brandegee;* San José. *Mrs. Bush;* and at the Presidio, San Francisco, according to *Prof. Greene.* A doubtful species with close affinities, as Mrs. Brandegee suggests, to *S. rubra*, but not readily identifiable with any form of that species, as it seems to differ in its longer, more terete and acute leaves, and winged seeds. From the South American *S. villosa* it differs in its lower growth, distinctly smaller flowers, shorter pedicels, and somewhat firmer and less flaccid leaves.

* * Slender spreading or erect annuals of the West and Southwest, scarcely fleshy, and with short deltoid stipules.

← Corolla pink (or white ?) more than half as long as the sepals.

S. diandra, Boiss. Viscid-pubescent to nearly glabrous: leaves not fascicled, linear-filiform: pedicels slender, about 2 lines long, spreading or deflexed: sepals in fruit $1\frac{1}{2}$ lines long, but little exceeded by the capsules: stamens usually but 2–3. — Fl. Orient. i. 733. *Arenaria diandra*, Guss. Prodr. Sic. i. 515. *Tissa diandra*, Britton, Bull. Torr. Club, xvi. 128. — Texas, *Drummond, Lindheimer*, Goshen, Calif., *Mrs. Brandegee*, Oregon, *Henderson*, and on sandy banks of the Columbia River in Klickitat Co., Washington, *Suksdorf*. In its wiry procumbent stems this species also suggests *S. rubra*, from which, however, it differs in its short deltoid stipules.

S. gracilis. Low, glabrous, 2–6 inches in height, diffusely branched: leaves $\frac{1}{3}$–1 inch in length: stipules deltoid: flowers small, subglobose, 1–$1\frac{1}{4}$ lines in diameter, not closely aggregated; pedicels 2–3 lines long: sepals elliptic ovate, a line or less in length, thick in the middle but scarious-margined: valves of the capsule a third to a half longer than the sepals; seeds angled, somewhat triangular in outline, finely but distinctly roughened. — *Lepigonum gracile*, Wats. Proc. Am. Acad. xvii. 367. *Tissa gracilis*, Britton, Bull. Torr. Club, xvi. 128. — Sandy ground, dried ponds, etc. Dallas, Texas, *Reverchon*, to S. California, *Parry, Nevius, Orcutt.*

S. tenuis. Dichotomously much-branched, becoming 8–10 inches in height, somewhat glandular-puberulent or pubescent above: leaves 6–10 lines long: the very numerous flowers somewhat larger than in the last and inclined to be closely grouped; capsule twice the length of the ovate-oblong sepals. — *Lepigonum tenue*, Greene, Pittonia, i. 63. *Tissa tenuis*, Greene ex Britton, Bull. Torr. Club, xvi. 128. *T. diandra*?, K. Brandegee, Zoe, iv. 84. — California near Alameda, *Greene*, Mt. Eden and Tulare, *Mrs. Brandegee.* The affinities of this species are almost equally with *S. salina*, Presl, and *S. diandra*, Boiss., and in a large series of specimens it may not be possible to distinguish it sharply from either. The flowers, however, are more numerous and smaller and the corolla less developed than in the former; the habit also is much more branching. From *S. diandra* it differs in the usually much shorter pedicels of the closely aggregated and at first subcorymbosely arranged flowers.

* * * Annuals or biennials, more decidedly fleshy, usually of maritime or saline habitat: flowers small or of medium size: corolla more or less conspicuous, white or pink, less frequently pink-purple: stipules ovate or deltoid.

S. salina, Presl. Commonly although not always pubescent: leaves often fascicled in the axils: sepals ovate to oblong-lanceolate, narrowed upward although obtuse at the summit, 2–$2\frac{1}{2}$ lines long: petals pink: capsule equalling or a third to a half longer than the calyx: seeds turgid, obovate, usually roughened, less frequently nearly or quite smooth (var. *leiospermum*, N. E. Brown, Eng. Bot. Suppl.). — Fl. Cechica, 95; Gray, Man. ed. 5, 95; Warming, Bot. Foren. Festkr. 1890, 238, fig. 20. *S. Canadensis*, Don, Mill. Dict. i. 426. *S. rubra*, var. *marina*, Gray, Man. ed. 1, 64. *S. media*, and var. *macrocarpa*, Gray, Man. ed. 5, 95. *Arenaria rubra*, var. *marina*, L. Spec. 423. *A. marina*, Bigel. Fl. Bost. 109; Roth in Hornem. Fl. Dan. xiii. t. 2231. *Buda marina*, Dumort. Fl. Belg. 110. *Lepigo-*

num salinum, Fries, Mant. iii. 34. *L. marinum*, Kindberg, l. c. 18. *L. medium*, Wats. Bibl. Index, 103 in part. *Tissa marina*, Britton, l. c. xvi. 126. — Common on both the Atlantic and Pacific coasts, also occurring upon the Gulf coast, and not infrequent about salt lakes and in alkaline regions of the interior, especially westward.

Var.? minor. Smaller, 2–3 inches high: flowers smaller and very numerous, on short pedicels ($\frac{3}{4}$–2 lines in length) and consequently rather densely aggregated. — *Buda marina*, var.? *minor*, Wats. in Gray, Man. ed. 6, 90. — Coast of New Hampshire and Massachusetts. An ambiguous form suggesting the western *S. tenuis* but smaller and with a better developed corolla.

S. borealis. More slender and in well developed specimens more diffusely branched than the preceding, 2–5 inches high, glabrous: leaves opposite, seldom fascicled; stipules ovate, broader than long, obtuse or obtusish: sepals ovate, 1–1$\frac{1}{2}$ lines long, very obtuse: petals shorter, white or pink: capsule ovate-oblong, usually nearly or quite twice as long as the calyx; seeds usually wingless and nearly or quite smooth. — *Arenaria rubra*, β, Michx. Fl. i. 274. (Dr. Britton, who has examined the type of Michaux's variety, pronounces it identical with this species.) *A. Canadensis*, Pers. (Syn. i. 504), the oldest specific name, but not to be selected for use under *Spergularia*, since *S. Canadensis* has been used by Don (Mill. Dict. i. 426) for a "pilose" and "rather hispid" plant, extending from "Canada to Carolina" and being doubtless *S. salina*, Presl; *Lepigonum medium*, Wats. Bibl. Index, 103 in part. *Tissa salina*, Britt. l. c. xvi. 127. *Buda borealis*, Wats. & Coulter, in Gray, Man. ed. 6, 90. — Sea-beaches and tidal marshes, Maine to Labrador.

* * * * Stout and fleshy perennials of the Pacific slope: flowers large.

S. macrotheca. Smooth to densely glandular-tomentose: stems spreading, ascending, 8–15 inches in height; leaves linear, acute, mucronate, 8 lines to 2 inches in length, about a line in breadth; internodes more or less developed, usually $\frac{1}{2}$–1 inch long: floral bracts resembling the leaves: inflorescence inclined to be racemiform; pedicels 4–12 lines in length, spreading or more or less deflexed: sepals lanceolate, acutish or somewhat attenuate to an obtuse point, thick in the middle, nearly smooth or viscid-glandular, conspicuously membranous-margined: petals roseate, shorter than the sepals: capsule oblong-ovoid, acutish, nearly equalling the sepals. — *Arenaria macrotheca*, Hornem. ex Cham. & Schlecht. Linnæa, i. 53. *Lepigonum macrothecum*, Fisch & Mey. Ind. Sem. Petr. iii. 14; Kindberg, Monog. 16, t. 1, f. 1; Wats. Bibl. Index, 103. *L. Chilense*, Fisch &

Mey. l. c. *Spergularia rubra*, Torr. Pacif. R. Rep. iv. 70. — California, chiefly on or near the coast. A polymorphous species, the varieties of which, although diverse in aspect, appear in a large series of specimens to be thoroughly connected by intermediates.

Var. leucantha. Erect or nearly so, with long internodes: leaves somewhat narrower and more erect than in the type: floral bracts reduced and inflorescence more distinctly cymose; pedicels elongated, rather rigidly spreading or deflexed: corolla white, nearly 6 lines in diameter. — *Tissa leucantha*, Greene, Fl. Francis. 127. — A variety of alkaline regions of the interior. A form from Vanden (*Mrs. Brandegee*), identical in habit and foliage, has magenta flowers.

Var. scariosa. Low, pale, smoothish near the base, and often very glandular-viscid above, densely leafy; the internodes scarcely or not at all developed: leaves $\frac{1}{3}$–$\frac{1}{2}$ inch long, acute; stipules conspicuous, ovate-lanceolate, acuminate, 4–5 lines long: inflorescence racemiform; pedicels not greatly exceeding the calyx. — *Tissa macrotheca*, var. *scariosa*, Britton, Bull. Torr. Club, xvi. 129. *Tissa pallida*, Greene ex Britton, l. c. xvi. 129; Fl. Francis. i. 127. — Coast at Monterey, California, *Torrey; Hooker & Gray*, 1877; *Gray*, 1885; and at Fort Point, *Brandegee*. *Tissa valida*, Greene, Erythea, i. 107, appears to be a firmer and more erect form of the same thing, also pale and very viscid, but with more elongated internodes and distinctly dichotomous cymose inflorescence. — Island of Santa Cruz, according to Professor Greene.

SPERGULA, L. Spurry. (Name from the Latin *spargere*, to strew, in reference to the scattering of the numerous seeds.) — Annuals with narrowly linear slightly fleshy apparently whorled leaves; one species common in America, having probably been introduced with grain from the Old World. — Gen. n. 375; Reichb. Iconogr. vi. t. 511–513.

S. arvensis, L. A foot or two high: leaves numerous in rather remote whorls: inflorescence a terminal naked spreading cymose panicle; pedicels often deflexed in fruit: petals white, equalling or slightly exceeding the sepals, 2–2½ lines long: capsule ovate-globose; seeds black minutely roughened with light-colored papillæ, acutely edged but scarcely winged. — Spec. 440; Walt. Car. 142; Eng. Bot. xxii. t. 1535; Pursh, Fl. 320; Hook. Fl. Bor.-Am. i. 92; Torr. & Gray, Fl. i. 174; Rothr. Pl. Alask. 444. *S. ramosissima*, Dougl. ms. according to Torr. & Gray, l. c. — Grain fields and cultivated grounds, common, United States and Canada, northward to Alaska. (Introduced from the Old World.)

II. — DESCRIPTIONS OF NEW AND HITHERTO IMPERFECTLY KNOWN PLANTS COLLECTED IN MEXICO BY C. G. PRINGLE IN 1892 AND 1893.

ERIODENDRON TOMENTOSA. Branchlets and petioles fuscous-tomentose; leaves 7-foliate; leaflets narrowly lanceolate, acuminate in both directions, sharply and finely serrate, sparingly hirsute upon the veins above, fuscous-tomentose beneath especially along the midrib, attenuate at the base to short scarcely distinct very tomentose petiolules: common petiole 2–3 inches long; stipules subulate, tomentose, persistent: peduncles short, thick: calyx turbinate-campanulate, $1\frac{1}{2}$–$1\frac{3}{4}$ inches long, finely tomentose on the outer surface, densely woolly within; teeth rounded, a fourth as long as the tube: petals red, linear-oblong, spreading, rounded at the apex, over 5 inches in length, 4–5 lines in breadth, silky-pubescent upon the outer surface, less pubescent or glabrate within: staminal tube 8 lines long, hirsute; free portion of the filaments spreading, exserted from the corolla; anthers anfractuose. — Collected on a barranca near Guadalajara, June, 1892 (no. 5300). This species is distinguished from *Eriodendron æsculifolia*, HBK., by its tomentose branchlets and foliage. The latter species is apparently represented by Mr. Pringle's no. 5324, from hills bordering on Lake Cuitzea, Michoacan, August, 1892, which accords in every regard with Kunth's description save that the leaflets range from 5 to 7 instead of 7 to 8. It differs, however, from Moçino and Sesse's Plate 94 in the Calques des Dessins, in having a glabrous calyx, and stamens really shorter than the petals; leaflets a little broader and distinctly petiolulate. As the plate shows the calyx to be pubescent and foliage as in *E. tomentosa*, it appears probable that it was not drawn from *E. æsculifolia*, as hitherto supposed, but really represents a distinct species, probably the *E. tomentosa* just described.

AYENIA GLABRA, Wats. The following additional characters may be given: fruit subglobose, shallowly 3-lobed, nearly 4 lines in diameter, light green, muriculately roughened with darker colored points; seeds dull brown, strongly rugose. — Collected in the barranca of Tequila, 2 and 17 October, 1893 (no. 4576).

BURSERA PRINGLEI, Wats. (Proc. Am. Acad. xxv. 145). This species was described from fruiting specimens. Mr. Pringle's no. 4381, collected on lava beds near Zapotlan, 27 May, 1893, shows the following additional characters: staminate flowers yellowish green: sepals 5,

ovate, acute, $\frac{1}{2}$ line in length: petals 2 lines long, with involute margins: stamens 10; anthers linear-oblong, twice the length of the filaments: disk deeply crenate.

NISSOLIA CONFERTIFLORA, Wats., var. LAXIOR. Agreeing with the type in foliage and technical characters, but having flowers nearly twice as large ($3\frac{1}{2}$–4 lines in length) upon more elongated pedicels. — Collected in the barranca of Beltran, 5 June, 1893 (no 4379).

ÆSCHYNOMENE AMORPHOIDES, Rose in litt. *Brya* (?) *amorphoides*, Wats. (Proc. Am. Acad. xxii. 406). Excellent flowering and fruiting specimens of this plant, collected by Mr. Pringle in the barranca of Tequila, 1 October, 1893 (no. 4613), fully confirm the view expressed in a letter from Dr. J. N. Rose, that it should be referred to the genus *Æschynomene*. The stamineal tube early splits on the ventral or lower side, and the pods are in all respects those of an *Æschynomene*.

CLITORIA (?) SERICEA, Wats. (Proc. Am. Acad. xxii. 407). Additional specimens collected on rocky hills near Guadalajara, June and July, 1893 (no. 4449), show the flowers of this species not hitherto described. Calyx short, campanulate, silky-villous, with narrow acuminate spreading teeth equalling the tube: corolla light blue, villous upon the outer surface, 6–7 lines long; petals subequal in length; the standard erect, open, orbicular, slightly thickened at the insertion of the claw; alæ oblong, abruptly contracted to a short claw: style bearded upon the upper surface: stamens all united. — An anomalous plant with the calyx rather of *Centrosema* but the bearded style and other characters of *Clitoria*.

CALOGANIA PULCHELLA, HBK., var. RACEMOSA. Leaflets broadly ovate, acutish: all or nearly all of the flowers borne in leafless axillary racemes (4–6 inches in length). — Collected by Dr. Edward Palmer at Tequila, Jalisco, August to September, 1886 (no. 379), and by Mr. Pringle near Guadalajara, 15 September, 1893 (no. 5164).

GALACTIA MULTIFLORA. Stems slender, woody, grayish brown, much branched, ascending, not twining: twigs, petioles, and peduncles cinereous-tomentose: leaves pinnately trifoliate; leaflets oval or somewhat obovate, rounded or retuse at the apex, dull green and glabrate above, cinereous-tomentose beneath; veins slightly prominent beneath; the lateral veins 7 to 9 pairs, parallel; margin slightly thickened and revolute; terminal leaflet 15 lines in length, two thirds as broad; the lateral slightly smaller: racemes axillary, 2–3 inches in length: buds acutely lanceolate in outline: calyx purplish, silky-villous, deeply 4-cleft, 4 lines in length; the upper segment oblong, acuminate; the

others linear or lance-linear, attenuate: corolla (in a dried state) deep purple, striated with green, 5–6 lines in length; standard obovate, entire at the base; alæ oblong, strongly auricled upon the upper edge; keel but slightly curved: stamens alternately shorter, one free. — Collected on rocky hills about Tequila, 1 July, 1893 (no. 4433). Fruiting specimens belonging to this species and collected in the same locality, 24 September, 1893, have leaflets 2–2½ inches in length, and oblong acuminate pubescent legumes.

ERIOSEMA MULTIFLORUM. A shrub, 3–4 feet high: stems brownish, furrowed-angulate, branched; branches covered with fine silky reflexed appressed pubescence: stipules ovate, acuminate, 2½–3 lines long, silky pubescent, tardily deciduous: leaves ascending, 3-foliate; common petioles 1–2 lines long; leaflets elliptic-oblong, obtuse, often apiculate, pale green, firm in texture, 3-nerved, finely pubescent above, appressed silky-villous beneath especially upon the prominent veins, 1½–2 inches long, a third as broad; the edges revolute: racemes crowded at the ends of the branches, subsessile, densely flowered, 1½–2½ inches long: bracts caducous ovate-rhombic, acuminate, silky, 2–3 lines long, somewhat exceeding the ascending pedicels: calyx finely pubescent, campanulate, rounded at the base, gibbous upon the upper side, parted to the middle; the segments lanceolate, attenuate; corolla yellow, 6 lines in length; standard with a slight bifornicate thickening just below the middle upon the inner surface; vexillar stamen free and with a bulbous thickening at the base: pods (scarcely mature) broadly oblong, shortly and obliquely acuminate, 7–8 lines in length, rufescent silky-villous, 2-seeded. — Collected on rocky hills near Tequila, 7 October, 1893 (no. 4548). This species stands near *E. grandiflorum*, Seem., but differs in its smaller, more numerous, and densely racemed flowers.

MIMOSA TEQUILANA, Wats. Excellent fruiting specimens found by Mr. Pringle on hillsides near Tequila, 26 September, 1893 (no. 4596), furnish the following characters not shown in the type: pods about 6 in a head, flat, thin, oblong, acute, about 3-seeded, ¾ inch long, 2½ lines wide, covered with weak transversely spreading prickles.

BEGONIA PALMARIS, A.DC. Mr. Pringle has been fortunate in rediscovering this species and securing the hitherto unobserved fertile plant. His excellent specimens, kindly identified by Monsieur Autran with the type in Herb. Boissier, furnish the following supplementary characters: plants apparently diœcious, 2–4 feet high: lower leaves much larger than the upper (hitherto described), becoming 8 or 9 inches broad: petioles 2 inches in length: lobes of the fertile flowers

white, broadly ovate, acute, sharply denticulate, smooth or sparingly pubescent upon the outer surface; the three outer ones 9 lines long, 6 lines broad; the two inner somewhat smaller: pistil of § *Knesebeckia*, A.DC.; ovary pubescent; capsule 8 lines long, 3-winged; wings unequal, broadest near the base. — Fruiting specimens collected on a barranca near Guadalajara, 23 September, 1891 (no. 5178); flowering plants of both sexes were collected in rich soil on shaded rocky slopes of barranca near Guadalajara, 29 July, 1893 (no. 4474).

RANDIA WATSONI. (*R. tomentosa*, Wats. Proc. Amer. Acad. XXV. 152, not of Blume.) Mr. Pringle's no. 4383, collected on lava beds near Zapotlan, 20 May, 1893, corresponds to the type of Dr. Watson's species except in its somewhat more obtuse leaves, and doubtless should be referred to this species. It furnishes the following additional characters: buds clavate, an inch in length, curved upward: calyx silky, 3 lines in length; segments short, linear; sinuses rounded: corolla tube 9 lines long, hirsute upon the outer surface; limb abruptly spreading, nearly or quite an inch in breadth; segments oval: anthers oblong, apiculate, sessile in the orifice of the corolla: stigma 2-lobed.

VALERIANA PALMERI, Gray. Mr. Pringle's specimens of this plant show that the root terminates in a small oblong tuber-like enlargement about half an inch in length. — Collected on shaded banks near Guadalajara, 2 September, 1893 (no. 4521).

STEVIA SERRATA, Cav., var. OVALIS. Leaves short, oval, scarcely narrowed at the base, 10–12 lines long, 5–7 lines broad. — Collected by Dr. Edward Palmer on the Rio Blanca, Jalisco, July, 1886 (no. 309), and by Mr. Pringle on rocky hills near Guadalajara, 28 August, 1893 (no. 4491). Mr. Pringle's no. 602, from Chihuahua, 1886, is nearly the same.

GUARDIOLA ROTUNDIFOLIA. Glabrous: stem rigid, brown, finely furrowed: leaves thickish, ovate-orbicular, closely sessile and clasping, remotely denticulate, cuspidate, glaucous, $1\frac{1}{2}$–$2\frac{1}{2}$ inches in diameter: inflorescences about 3-headed, closely subtended by floral leaves: scales of the involucre 4–5 lines long, finely striated, ovate, narrowed to an obtuse point: achenes $2\frac{1}{2}$ lines in length, mottled, truncate, contracted below to a thick short stipe: corollas in a dried state greenish. — Collected on hills near Tequila, 15 October, 1893 (no. 4571). Near *G. platyphylla*, Gray, but with larger, more orbicular, less dentate, and more clasping leaves; fewer larger heads, with broader involucral bracts.

LIABUM CERVINUM. Arachnoid-tomentose, 2 feet in height: stem

simple, leafy to the summit, furrowed, springing from large tuberous-thickened and clustered roots: leaves 5–6 inches in length, glabrate above, white woolly beneath except upon the nerves, narrowly connate, deeply and palmately cleft into linear attenuate one-nerved spinulose-denticulate segments; the latter 2–3 lines in breadth, with revolute margins: peduncles and involucres densely fuscous-tomentose: heads corymbose, about 6, discoid, an inch in height: scales of the involucre lance-linear; the outer shorter: corollas yellow, 5–6 lines long; the tube hirsute: achene silky; pappus tawny, readily deciduous. — Collected on bluffs of barrancas, San Marcos, 9 June, 1893 (no. 4398). Near *L. Palmeri*, Gray, but differing in its arachnoid and not glandular stem, leafy to the summit, its somewhat larger heads and more imbricated involucre, as well as in the more acute segments of the leaves, which in their mode of forking much resemble stag-horns.

Asclepias Jaliscana. Stem simple or sub-simple, erect, setose-hirsute, a foot in height: leaves sessile, oval to ovate-oblong, with rounded apex, sparingly hirsute upon both surfaces, ciliolate, glaucous beneath: flowers large, greenish, in several pedunculate, rather few-flowered umbels; peduncles 8 lines to 1 inch long, little exceeding the pedicels; both hirsute: calyx segments lance-linear, half as long as the corolla lobes; the latter reflexed, 5 lines in length, purplish upon the lower surface, green upon the upper: hoods $2\frac{1}{2}$–3 lines long, scarcely at all auriculate at the inner angles; horn broad and conspicuously exserted: fruit tomentose, slender, fusiform. — Collected on the Rio Blanco, Jalisco, by Dr. Edward Palmer, in June, 1886 (no. 20); then by Mr. Pringle in plains near Guadalajara, June, 1889 (no. 3020), and again in dry soil, on plains and hills near the same city, July, 1893 (no. 4444). This species has the pubescence and much of the habit of *A. setosa*, Benth., with which it has been hitherto confounded. It is to be distinguished by its broader and more obtuse leaves, more glaucous beneath, its sub-simple stem, and its somewhat larger flowers with scarcely auriculate hoods and broad horns. Hartweg's no. 213, Bentham's type, as well as a number of other specimens correctly referred to his species, show that in it the horn is relatively slender and the hoods well auricled at the upper inner angles.

Gonolobus sororius, Gray (Proc. Amer. Acad. xxii. 437), described from fruiting specimens, is now shown in flower by Mr. Pringle's no. 4435, collected on rocky bluffs above Tequila, 3 July, 1893. The following characters may be added: flowers in numerous axillary short-peduncled or subsessile umbels; pedicels 6–8 lines long: calyx segments lance-linear, obtusish, spreading or reflexed: corolla

yellow, 5 lines in diameter; segments ovate-lanceolate, acutish; orifice covered with a conspicuous dense white beard: anther cells nearly upright: crown of five short obtuse scales, adnate to the base of the corolla. — In foliage and bearded corolla this species approaches *G. barbatus*, HBK., which, however, has larger flowers and is from the coast.

PHEROTRICHIS LEPTOGENIA. Densely hirsute: stems simple, erect, 1–2 feet in height, from a fusiform root: leaves short-petioled, obtuse; the lower oval, smaller, subcordate; the upper ovate to ovate-lanceolate: flowers in successive sessile intra- and super-axillary umbels; pedicels 3 lines long: calyx hirsute; segments lanceolate, acute, $1\frac{1}{2}$ lines long: corolla 4–6 lines in breadth; its segments widely spreading, oblong-ovate, obtuse, greenish, striped with yellow, very thinly bearded or glabrate: corona equalling but not exceeding the stigma: membranous appendages of the anthers conspicuous: appendage of the stigma conical obtuse. — Collected on hills near Patzcuaro, 30 July, 1892 (no. 5279), and again on dry slopes near Guadalajara, 25 July, 1893 (no. 4466). Possessing the habit of *P. Schaffneri*, Gray, and *P. Balbisii*, Gray, but differing in its somewhat larger, more open and almost glabrous corolla. Mr. Pringle's no. 1148, collected in the Mapula Mountains of Chihuahua, 26 October, 1886, is the same, and shows the fruit to be lanceolate in outline, very acute and hirsute, $2\frac{1}{2}$ inches in length.

EHRETIA CORDIFOLIA. A large tree with light brown glabrate branches; branchlets somewhat hirsute; lenticels conspicuous: leaves thick, of harsh texture, ovate, obtusish or very shortly acuminate, serrate, cordate or subcordate, scabrous above, paler and soft pubescent beneath, 2–3 inches in length, two thirds as broad; petioles pubescent, $\frac{1}{2}$ inch in length: panicles terminal, only 1–$1\frac{1}{2}$ inches in length: sepals ovate-lanceolate, a line long: fruit oblong, 4-celled, 4 lines in length, $2\frac{1}{2}$ lines in diameter. — Collected in valley, Zapotlan, 19 May, 1893 (no. 4382). Of this species fruiting specimens only are at hand. They possess a strong habital resemblance to *E. Mexicana*, Wats., but have broader cordate leaves.

IPOMŒA STANS, Cav., VAR. HIRSUTA. Very hirsute: leaves broad, sessile: sepals short, suborbicular. Collected by Dr. Edward Palmer on the Rio Blanco, Jalisco, August, 1886 (no. 324), and by Mr. Pringle on plains near Guadalajara, 30 August, 1893 (no. 4488). The typical form is merely puberulent, and has longer relatively narrower sepals.

IPOMŒA PERLONGA. Stem a little puberulent or glabrous, slightly

armed with a few small scattered prickles: leaves orbicular, deeply cordate, shortly acuminate, entire, 2–4 inches in diameter, glabrous at maturity, somewhat paler beneath; petioles $1\frac{1}{2}$–$2\frac{1}{2}$ inches in length: peduncles very long, becoming nearly a foot in length, each bearing a regular rather closely 6 to 12-flowered cyme: pedicels thickened upward and becoming deflexed in fruit, 3–8 lines long: sepals smooth, ovate-oblong, obtuse, apiculate, in anthesis but $2\frac{1}{2}$ lines in length, becoming enlarged in fruit: corolla funnel-shaped, $1\frac{3}{4}$ inches long; the tube and throat rather slender, white; the limb bright blue (purple in dried specimen), $1\frac{1}{3}$ inches in diameter: fruit globose, apiculate. — Collected on hills about Tequila, 15 October, 1893 (no. 4531). Distinguished by its strikingly long-peduncled inflorescences and markedly bicolorous corolla.

Evolvulus prostratus. Perennial: root perpendicular with horizontal branches: proper stem very short; branches 4 to 8, prostrate, simple, 4–6 inches in length, silky-villous: leaves imbricated in two rows and somewhat reflexed, suborbicular, rounded at the apex, rounded or subcordate at the base, 4–5 lines in diameter, subsessile, glabrous above, silky-villous beneath: buds and fruit entirely concealed beneath the leaves: flowers raised between them; peduncles $1\frac{1}{2}$ lines in length, equalling the calyx, both villous: corolla white, 2 lines in diameter: capsule 2–3-seeded; seeds dull brown. — First collected by Dr. Thomas Coulter in Mexico without exact locality (no. 1011); then by Bourgeau in the Valley of Mexico at Santa Fé, 5 July, 1865–6 (no. 323), wrongly referred to *E. holosericeus*, HBK. Collected by Mr. Pringle on dry thin soil of hills near Guadalajara, 26 July, 1893 (no. 4445). In vegetative habit this species strongly suggests *Lysimachia nummularia*.

Bassovia Donnell-Smithii, Coulter (Bot. Gaz. xvi. 145). Mr. Pringle has rediscovered this Guatemalan plant in the barranca of Beltran, 6 June, 1893 (no. 4378). The range is thus considerably extended. His specimens and field notes show that the stem is about 10 feet high, twice regularly dichotomously branched. The calyx is somewhat accrescent, and the fruit is globular, orange-red, many-seeded, and about 5 lines in diameter.

Pinguicula parvifolia. Base a small loose bulb, 4 lines in diameter, provided with a number of fine fibrous roots: leaves 3 to 5, elliptic-oblong, at the time of flowering not exceeding 3 lines in length and $1\frac{1}{4}$ lines in breadth; petioles margined and becoming broad and somewhat scarious below: scape single, strict or slightly curved, very minutely glandular near the summit: the five segments of the

calyx subequal, lance-linear, acutish, scarcely exceeding 1½ lines in length: corolla 6–8 lines long; the limb bluish purple; the segments broadly oblong or somewhat spatulate; throat yellow as well as the tapering nearly straight or moderately curved spur (2–2½ lines in length). — Collected on mossy gravel bluffs near Guadalajara, 23 June, 1893 (no. 4397). An attractive little species distinguished by its paucity of foliage.

VITEX PYRAMIDATA. Tall shrub, 10–15 feet in height: branchlets, petioles, and inflorescences pulverulent-pubescent: petioles long, deeply sulcate above: leaflets 5, elliptic, mucronate, entire, rounded at the base, becoming decidedly coriaceous with age, green and smoothish above, with sulcate veins and minute reticulation, pale and tomentose beneath, 3–4 inches long, nearly half as broad; petiolules 3 lines long: the sulcate peduncles springing from the upper axils and bearing rather dense compound pyramidal panicles, sometimes subtended by two trifoliate bracts: calyx scarcely a line in length, shortly 5-toothed: corolla strongly bilabiate, about 6 lines long; the tube enlarged upward, about equalling the limb; segments rounded, ovate, the two upper suberect, the lowest the largest: stamens exserted, recurved at the summit, anther cells divergent: fruit 6 lines in diameter, consisting of a tough exocarp surrounding an irregularly sculptured woody endocarp, enclosing four 1-seeded cells. — Tequila, Jalisco, August, 1886, collected by Dr. Edward Palmer; rediscovered by Mr. Pringle on rocky hillsides about Tequila, 29 June, 1893 (no. 4429). Dr. Palmer's fruiting specimen was referred to *V. mollis*, HBK., by Dr. Watson (Proc. Amer. Acad. xxii. 444). He states also that the dark brown fruit is eaten by the natives under the name of "ahuilote." Mr. Pringle's flowering specimens show the plant to be amply distinct from *V. mollis*. The paniculate inflorescence is rare in American species although common in those of the Old World.

CYTINUS OXYLEPIS. Fuscous and somewhat granular-tomentose, 2–3 inches high: the short scaly stem not greatly enlarged at the base, and not equalling in length the thick clavate inflorescence: scales both of the stem and inflorescence lanceolate or ovate-lanceolate, acuminate, smooth, spreading, 1½ lines in length: flowers bisexual; segments of the perianth 6–7, ovate, acute, granular-fuscous upon the back, a line in length, united below into a shallow cup: anthers about 6, uniseriate and adnate to the short thick style: stigma obscurely lobed; ovaries more than half immersed in the thickened axis of the inflorescence; placentæ 5–6. — Collected on lava beds near Zapotlan, 13 and 27 May, 1893 (no. 4373). A fungoid parasite upon woody

roots of Burseras. The stem is 3–4 lines in diameter and the inflorescence is 2–3 times as thick. The species appears to be distinguished from all other plants of the genus by its perfect flowers, as well as by its small and very acute scales.

PEDILANTHUS PRINGLEI. Stems smooth, alternately few-branched: leaves closely and softly puberulent upon both surfaces, lanceolate, acuminate, 1½–2 inches long, subsessile by an abruptly narrowed base; midrib prominent and white below; bracts minute, grayish tomentose, caducous; pedicels 1½–3 lines long: involucres acutish at the base, dark purplish red, 5 lines long; the upper lip quadri-glandular at the base inside, glabrous, abruptly bent, attenuate to a very narrow but truncate entire or slightly retuse apex; segments of the lower lip finely ciliated, otherwise glabrous; style slender, dark red, trifid; capsule smooth, 3–3½ lines in length upon a stipe (½ inch long); seeds ashy, ovoid, apiculate. — Collected on limestone ledges, Las Palmas, San Luis Potosi, 25 July, 1891 (no. 5107). Near *P. Tithymaloides*, Poir., but with smaller puberulent leaves, darker colored involucre, acutish at the base and with a more slender and attenuate upper lobe.

ACALYPHA HYPOGÆA, Wats. (Proc. Am. Acad. xxii. 451). Has been rediscovered by Mr. Pringle on damp slopes near Guadalajara, 28 July, 1893 (no. 4460). His specimens show the following additional characters: stem hirsute, 4–6 inches in height: the largest leaves 15 lines in length: staminate spikes very small, 1–2½ lines long, upon slender axillary often deflexed peduncles (a line in length).

ACALYPHA POLYSTACHYA, Jacq. *A. filifera*, Wats. (Proc. Am. Acad. xxii. 451), has been again found by Mr. Pringle in Jalisco (no. 4470). As Dr. Rose notes, this species is not to be distinguished from *A. polystachya*, Jacq., represented by a rather wooden plate in the Hortus Schönbrunensis.

LIPARIS GALEOTTIANA, Hemsl. This species, insufficiently characterized by Richard and Galeotti, Ann. Sci. Nat., ser. 3, iii. 18, as *Malaxis Galeottiana*, was transferred to Liparis by Mr. Hemsley, Gard. Chron. 1879, i. 559. No exact occurrence of the plant in Mexico was known until Dr. Watson, Proc. Am. Acad. xxii. 454, doubtfully identified with the description a specimen collected by Dr. Palmer on the Rio Blanco, Jalisco. Mr. Pringle has secured the same plant on the Sierre Madre, Chihuahua, 30 September, 1887 (no. 1527), and on moist slopes, Patzcuaro, 18 July, 1892 (no. 5274), and finally on dry granitic hills near Guadalajara, 17 August, 1893 (no. 4512). A portion of the last mentioned specimen was sent to Kew, where it was definitely identified with the species in question. Mr. Pringle's speci-

mens bear out Dr. Watson's amplification of the characters, and confirm its distinctness from *L. elliptica*, Reichb. f.

ISOCHILUS UNILATERALE. Glabrous: stems several, slender, simple, 8 inches in height, roughened especially near the base by numerous minute warts: leaves linear, slightly retuse, rather rigidly erect, $1\frac{1}{2}$–2 inches long, finely striated: racemes single, simple, terminal, secund, about 7-flowered: bracts oblong, obtuse, purplish; pedicels exserted 2–3 lines: flowers large for the genus, 6 lines long, purple, strongly gibbous upon the side toward the labellum, not noticeably fleshy: sepals subequal in length, carinate, acutish: petals oblong, obtusish, slightly broader than the sepals, and not carinate; labellum lance-oblong, with the sigmoid flexure characteristic of the genus but without lateral lobes: fruit 6 lines in length. — Collected on oaks, Tamasopo Cañon, 23 June, 1891 (no. 5116). This species, with much the habit of *I. lineare*, R. Br., has larger more one-sided flowers in a looser raceme.

NEMASTYLIS FLAVA. Bulb ovoid, 8 lines in diameter, dark brown, with a tuft of fibrous roots at the base; stems or rather scapes 1 to 3, slender, simple, leafy only at the base, 8–10 inches high, bearing at the summit a single 2–3-flowered spathe of 3 unequal lance-linear or linear-oblong acuminate bracts (the largest $1\frac{1}{2}$–$1\frac{3}{4}$ inches in length): the outer leaves reduced to acute scale-like sheaths; the inner narrowly linear, attenuate, equalling the scape: pedicels about an inch long: flowers 1–$1\frac{1}{4}$ inches in diameter, bright yellow: segments oblanceolate to obovate, acuminate; the outer 7 lines in length; the inner two thirds as long and with rounded thickened areolæ at the base: filaments connate; column $1\frac{1}{2}$ lines high; anthers $2\frac{1}{2}$ lines long, inclining to curl with age: capsule ovoid, smooth, shallowly six-furrowed, $\frac{1}{2}$ inch in length. — Collected on gravelly soil near Guadalajara, 23 June and 21 August, 1893 (no. 4400). Near *N. bracteolata*, Baker, but with single heads, distinctly unequal perianth segments, and, of course, different geographic position.

DIOSCOREA GRANDIFOLIA, Schlecht. Mr. Pringle's no. 4547, collected on talus of cliffs, barranca of Tequila, 4 October, 1893, corresponds well to the characterization of this species. The fertile plant, of which I find no description, furnishes the following characters: fruiting racemes about 3 inches in length upon peduncles about an inch long: fruit elliptic in outline, reflexed-spreading, not closely imbricated, 7 lines in length, half as wide.

D. PRINGLEI. Glabrous: stem twining: leaves ovate, acuminate, entire, cordate with an open sinus, 9–11-nerved, somewhat paler

beneath, 2–3 inches in length, about the same breadth: flowers of the staminate plant in slender compound racemes; the latter scarcely pedunculate, either solitary in the axils or borne at the successive nodes of the leafless ends of the stem; branches of the racemes numerous, about 5-flowered, the uppermost reduced and fewer-flowered: pedicels $\frac{1}{2}$ line long: bracts lance-linear, acuminate: perianth campanulate, pale yellow; segments obovate, rounded at the ends, $1\frac{1}{4}$ lines in length: stamens 3; filaments slender; rudiments none: fertile racemes axillary, short-peduncled, in fruit 2–3 inches in length: fruit suborbicular, retuse, $3\frac{1}{2}$ lines in diameter (immature). — Collected on grassy slopes of barranca near Guadalajara, 7 September, 1893 (no. 4526).

D. HIRSUTICAULIS. Pubescent-hirsute throughout with crisped white hairs: stem elongated, twining: leaves deltoid-ovate, acuminate, entire, cordate with an open sinus, about 9-nerved, 2–3 inches long, nearly as broad; petioles 8 lines in length: racemes of the staminate plant slender, simple, about $1\frac{1}{2}$ inches in length upon peduncles perhaps half as long, solitary in the axils or borne at the successive nodes of the nearly leafless ends of the stems; pedicels but $\frac{1}{3}$–$\frac{1}{2}$ line in length: perianth campanulate, a line in diameter; segments ovate-oblong, obtuse: stamens only 3, filaments short and straight: inflorescences of the female plant axillary, solitary, in fruit $1\frac{1}{4}$ inches in length, $\frac{3}{4}$ inch in diameter: fruit stramineous, broadly elliptic, smooth, $4\frac{1}{2}$ lines in length, $3\frac{1}{2}$ lines in breadth, reflexed and very densely imbricated. — Collected under dry ledges, barranca of Tequila, 14 October, 1893 (no. 4572).

D. PLUMIFERA. Glabrous: stems twining: leaves thin, ovate acuminate, entire, cordate with a broad sinus, 7–11-veined, slightly paler beneath, $2\frac{1}{2}$–3 inches long, 2 inches broad: staminate flowers yellowish green, $2\frac{1}{2}$ lines in diameter, borne in long slender feathery panicles; the latter geminate at the axils, 4 inches in length, $\frac{1}{2}$ inch in diameter; the numerous short lateral branches about 3-flowered; pedicels $\frac{3}{4}$–1 line long, very slender: bracts lance-linear, acuminate, 1 line in length: segments of the perianth oblong-lanceolate, obtuse: fertile stamens 3, slender, not at all rigid or divaricate, alternating with 3 rudiments: racemes of the fruiting plant short-peduncled, densely flowered, 2 inches in length: fruit (scarcely mature) broadly elliptic, 4 lines long, reflexed, imbricated. — Collected under cliffs, barranca of Tequila, 14 October, 1893 (no. 4530).

D. MILITARIS. A slender vine 2–4 feet in length: stem smooth, from a small tuber: leaves rather distant, 3-lobed and halberd-shaped,

hirsute-pubescent upon both surfaces; the central lobe lanceolate attenuate to a sharp point, 3-nerved, $1\frac{1}{4}$–$2\frac{1}{2}$ inches long, 3–7 lines broad; lateral lobes 6–8 lines long, somewhat falcate, obtuse; the uppermost leaves reduced, entire; petioles $\frac{1}{2}$ inch long: staminate racemes slender, loosely flowered, including the peduncle 2–4 inches long: pedicels $\frac{1}{2}$ line long, equalling or somewhat exceeding the minute subulate bractlets: perianth $1\frac{1}{4}$ lines broad; segments of two forms; the 3 outer spreading, oblong, obtuse; the inner a little narrower and acutish, ascending, incurved: stamens 3, very short, perhaps one third as long as the segments of the perianth: fruiting raceme $1\frac{1}{2}$–2 inches long upon peduncles of nearly equal length: capsules glabrous, reflexed, somewhat imbricated, elliptic in outline, 6 lines long, half as broad. — Collected upon the steep sides of wet cliffs of the barranca of Guadalajara, 8 September, 1893 (no. 5434).

III. — NOTES UPON THE GENUS GALINSOGA.

Few genera have been subject to so much doubt as to proper limitation as *Galinsoga*. This is equally evident from its treatment in De Candolle's Prodromus, in which of its supposed six species five are questioned, and from the writings of subsequent authors who have dealt with it. Satisfactory generic limitations can perhaps only be obtained by a monograph including not only the plants hitherto ascribed to *Galinsoga*, but several neighboring genera, for which sufficient material could only be found in the larger foreign collections. Something, however, may well be done at more accurate specific and varietal definition of forms growing within our own country. So far as I know, only one species is at present recognized upon the continent of North America north of Mexico, that is *G. parviflora*, Cav. The telling characteristics of this species, when obtained from the earliest descriptions and figures as well as from the examination of material completely in accord with these, are as follows: stem and branches smoothish or finely and more or less appressed pubescent: rays white or whitish, little exserted: pappus of the disk flowers consisting of spatulate obtusish scales equalling the achene. Of this species several varieties have been suggested. Dr. Gray in the *Pl. Wrightianæ*, ii. 98, founded two upon the relative development or absence of the pappus in the ray flowers; namely, var. SEMICALVA, with naked ray achenes, and var. CARACASANA, with abortive ray pappus. The writer has examined a large number of specimens of the species both from North America and from the most widely separated regions of the world, and finds

that the ray pappus is never developed as in the disk flowers, but is always more or less abortive, consisting of fewer, shorter, and more slender bristles. Furthermore, the variation in its development seems absolutely independent of any other characters either floral or habital, so that varieties founded upon this character can have no more than formal value. Indeed this is the view which Dr. Gray subsequently took in the *Synoptical Flora*, i. 303. On the other hand, the form and length of the pappus in the disk flowers seem more worthy of note, and several plants have recently been received at the Gray Herbarium which differ so materially in this regard and in their greater hispidity from the typical *G. parviflora*, Cav., as to call attention to the group. In those plants from the Eastern and Middle States, as cited below, the pubescence of the upper internodes is not only considerably more copious but much more spreading, the rays are bright white and well exserted, and the pappus scales of the disk flowers, while in length about equalling the achenes as in *G. parviflora*, have a very different form, being narrower and attenuate to a bristle-like apex. One of these specimens, collected by Mr. H. L. Clark at Pittsburg, Pa., was forwarded to Geneva for comparison with De Candolle's *G. parviflora*, var. *hispida*, and has been pronounced by M. Buser identical with that variety. Still a third plant of this genus quite distinct from the preceding has been collected upon waste land about Camden, N. J., by Mr. C. F. Parker. It is characterized by considerable pubescence, distinctly purple rays, and disk pappus but half as long as the achene. Portions of this plant have been forwarded to Geneva and Kew for comparison with *Vargasia Caracasana*, DC., and *Galinsoga hispida*, Benth., and it proves identical with both, while garden specimens of Regel's *G. brachystephana* show it with scarcely a doubt to be the same. This shows that Dr. Gray was in error in regarding his *G. parviflora*, var. *Caracasana* the equivalent of De Candolle's *Vargasia Caracasana*. While Mr. Parker's plant from Camden, the weed-centre of the United States, by no means shows this species of tropical origin to be established in our country, it may well be found that a portion of what has been hitherto referred to *G. parviflora* is this plant, especially as it is more or less extensively introduced in Eastern Europe, where it bears the name *G. brachystephana*, Regel. Summing up the different forms as well as the material at hand permits, we may divide them as follows.

* Rays white, pappus of the disk flowers about equalling the achene.

G. PARVIFLORA, Cav. Smoothish, the upper internodes with a sparing sub-appressed pubescence: pappus of the disk flowers of spatu-

late obtusish scales. — Ic. iii. 41, t. 281; DC. Prodr. v. 677; Gray, Syn. Fl. i. 303, including vars. *semicalva* and *Caracasana* of Pl. Wright. *Bidens mercurialis folia*, &c., Feuillée, Journ. Obs. Phys., &c. ii. 744, t. 32. — Generally distributed from New England to Oregon and southward to Mexico.

Var. HISPIDA, DC. Prodr. v. 677. Pubescence especially of the upper internodes more copious and not at all appressed: scales of the pappus in the disk flowers attenuate and bristle-tipped: foliage, etc. as in the type. Alleghany City, Pa., 9 August, 1869, *Porter;* Milwaukee, Wisc., October, 1881, *Sherman;* Providence, R. I., 5 July, 1892, *Bailey & Collins;* Pittsburg, Pa., 1893, *Clark;* Cambridge, Mass., and doubtless widely introduced. The same thing has been recently collected in Central America by Capt. John Donnell Smith, nos. 759, 2352, where it is doubtless indigenous. While in general readily distinguishable by the characters described, this variety occasionally so intergrades with the type that specific distinction seems very undesirable.

* * Rays purplish: pappus of the disk flowers but half as long as the achenes.

G. HISPIDA, Benth. Bot. Sulph. 119. The oldest name under the genus. *G. brachystephana*, Regel in Walper's Rep. vi. 722. *Vargasia Caracasana*, DC. Prodr. v. 676. Doubtfully established at Camden, N. J., 15 September, 1870, *C. F. Parker.* So far as the northern and eastern parts of our country are concerned, all these plants are doubtless introduced; in Texas, New Mexico, and Arizona forms of *G. parviflora* may well be indigenous, as Dr. Gray suggests.

IV. — MISCELLANEOUS NOTES AND NEW SPECIES.

SILENE SUBCILIATA. Perennial: stem strict, terete, glabrous, a foot and a half high, enlarged at the nodes: leaves glaucous, slightly fleshy and finely lepidote, narrowly oblong to linear-oblanceolate, glabrous on the surfaces but sparingly ciliated, 1½–2 inches long, obtusely pointed with callous tips, narrowed below to winged commonly ciliated petioles; floral leaves reduced to lance-linear acute bracts: flowers rather distant, pedicellate, forming an elongated racemiform inflorescence: bractlets lance-linear, ciliated: calyx glabrous, cylindric, 10 lines in length: petals deep red, 1¼ inches long; the blade elliptic, entire, obtuse; the appendages lanceolate, entire: fruit and seeds not seen. — Type in the Gray Herbarium, collected by Mr. Charles Wright, but without number or date, and bearing only the locality "Texas and Louisiana." It is to be hoped that this attractive species may be re-

discovered. It is evidently related to *S. regia*, Sims, and *S. laciniata*, Cav., but differs from the former very much in the form of its leaves, from the latter in its entire petals, and from both in the entire absence of glandular pubescence. From *S. Virginica*, L., it differs in petals, pubescence, and texture of the leaves.

SILENE LACINIATA, Cav. Prof. W. R. Dudley calls my attention to the fact that the seeds in this species and its broad-leaved variety (*S. Greggii*) are not infrequently vesicularly crested, as in the Californian *S. Parishii*, Wats.

ARENARIA GRŒNLANDICA, Spreng. This attractive species, possessing a wide and interesting north and south distribution, seems worthy of special study. The typical form, with subglobose obtusely pointed capsules and with stems few and decumbent from a spreading rosette of somewhat fleshy leaves, occurs chiefly in Greenland and Labrador. The common form of the mountains of Maine, New Hampshire, and Eastern New York becomes rather densely matted, and has many erect stems with very numerous erect less fleshy leaves about the base. Its capsules are ovoid to oblong and more or less acutely pointed. Although in temperate latitudes usually confined to rocky soil of the mountains or higher hills, this species descends nearly or quite to the seashore in Maine, at Bath and at Mt. Desert. It has also been found at Middletown, Conn. When growing at these lower altitudes, the plant is scarcely at all matted and the segregated few-stemmed individuals have simple or at least less fibrous roots and fewer thicker leaves than in the mountain form, with which however they are connected by frequent intergradations. In these forms also the capsule is ovoid or oblong rather than globose. Until recently the Shawangunk Mountains of New York have passed as the southern limit of this species, but there can be no doubt (see Mem. Torr. Club, iii. 14) that many of the specimens from the higher Mountains of North Carolina, hitherto referred to *A. glabra*, Michx., are practically identical with the plant of the White Mountains, notwithstanding the fact that the flowers average smaller. The question whether it is best to retain these forms of temperate regions in the same species with those of Greenland and Labrador presents much difficulty. The differences in habit, size of the flowers, and notching of the petals are often striking. Unfortunately, however, no one of these characters holds satisfactorily in a large series of specimens, and it appears that the change from the few-stemmed decumbent plant with a basal rosette of leaves and single simple root to the matted plant with fibrous roots and many stems, erect by mutual crowding, is a difference which may well be due exclusively

to the greater length of the season. As to the size of the flowers, a series of specimens collected at Mt. Desert by Mr. Redfield and Mr. Rand conclusively shows that this is largely a function of the season, the autumnal flowers being much smaller than the earlier ones, indeed far smaller than those of the southern form. The shape of the capsule gave promise of furnishing a good character, but the difference between globose and ovoid is not a sharp one, and on examination it proves that subglobose capsules occasionally occur in the White Mountain plant, and even in the few Greenland plants which could be examined the capsules were found to vary to ovoid, so that no sharp distinction can be founded upon this character.

DALEA NEGLECTA. Branches slender, terete, glabrous, glandular-punctate: leaves smooth, 1½–2 inches in length; leaflets 5–7 pairs and odd one, 4–5 lines long, elliptic or oblanceolate, petiolate, obsoletely crenate, rounded at the apex, acute at the base, smooth and veinless above, glaucous, glandular-punctate and 1-nerved beneath: peduncles very slender, equalling or exceeding the curved loosely-flowered spike (1½ inches in length): flowers 2½–3 lines long, spreading or reflexed upon very short pedicels: calyx turbinate, strongly ribbed with yellow glands and covered with very short upwardly appressed or rather incurved hairs; teeth lance-linear, acute, inflexed, nearly equalling the tube: corolla in dried specimens bright purple. — Collected at Guanajuato, Mexico, by Prof. Alfred Dugès (no. 2576). Habit nearly of *D. nutans*, Willd. The peculiar pubescence of the calyx appears rather exceptional in the genus, being in most species straight, silky or lanate.

SAXIFRAGA PENNYSLVANICA, L. A specimen of this species, collected at Royalton, Vt., with deep red petals, has recently been received at the Gray Herbarium from Miss Emily P. Robinson of Manchester, N. H. A hasty search in the literature of the species has failed to show any record of this variation, the petals being always described as greenish or yellowish green. As the anthers are bright orange, the dark red or crimson petals give to the flowers a much more striking contrast of color, doubtless correlated with insect pollination. So far as observed, the specimen in question presented no other differences from the typical form.

ASTER PAUCICAPITATUS. Stems several, simple, flexuous, leafy to the summit, ribbed, somewhat pubescent, 10 inches to 1½ feet high: leaves elliptic-oblong, obtuse or obtusish, mucronulate, sessile by a scarcely narrowed base, finely and somewhat glandularly pubescent, 9–16 lines long, 3–5 lines broad, erect or ascending: heads usually

single, terminal, short-peduncled, less frequently 3–4, corymbose, including the rays 1¼–1½ inches in diameter: involucre of few subequal lance-linear attenuate finely pubescent and ciliolated scales; the latter loosely imbricated in 2–3 series, rather firm and broadly white-margined near the base, 4 lines long; the very acute tips often purplish: rays 12–18, white or pink, 6 lines in length, 1½ lines in breadth, 3-toothed at the apex; disk flowers including the silky achenes 5 lines in length: pappus rather copious, of unequal bristles but not distinctly double. — *A. Engelmanni*, Gray, var. (?) *paucicapitatus*, Robinson, Proc. Am. Acad. xxvi. 176. — Collected by C. V. Piper in the Olympic Mountains, Washington, August and September, 1890 (nos. 926, 934). Never satisfied with the earlier and somewhat provisional disposition of this plant, I have returned to its study, and conclude that it is specifically distinct from *A. Engelmanni*, through its much less imbricated involucre of subequal scales. It should stand in the genus near *A. Xylorhiza*, Torr. & Gray.

Dioscorea Dugesii. Stem slender, climbing, angulate, sparingly pubescent with fine brown hairs: leaves ovate, cordate, sharply acuminate, thin, 9-nerved, pellucid-lineolate, nearly or quite smooth, 2½ inches long, 2 inches broad; petioles pubescent, 1½ inches long: staminate flowers 1½ lines in diameter, borne in short slender simple solitary axillary pubescent racemes 1½–2 inches in length: peduncles but 2 lines long; pedicels scattered, ½ line in length, 1–3-flowered: bracts subulate, considerably exceeding the pedicels: segments of the perianth linear-oblong or linear-lanceolate, obtuse, with crisped margins: stamens six, equal, inserted on the perianth near its base, half as long as the segments. (Fertile plant not seen.) — Collected by Prof. Alfred Dugès at Guanajuato, 1880 (no. 37). A slender species, somewhat resembling *D. remotiflora*, Kunth.

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Presented April 11, 1894.

Polygala puberula, Gray, var. ovalis. Low, 1–3 inches in height: leaves all oval or slightly obovate, very obtuse, apiculate, 6–8 lines long, half to two thirds as broad, purplish beneath: racemes scarcely exceeding the leaves, more closely flowered than in the type; pedicels ascending. — Collected in damp hollows of hills near Guadalajara, Jalisco, 22 May, 1893 (no. 4472).

Anoda hastata, Cav. A form apparently of this species, but with flowers orange-yellow instead of purple, has been collected by Mr. Pringle in the barranca of Tequila, 2 October, 1893 (no. 5454). Except the color, however, no characteristics in the specimens in question form satisfactory specific or even varietal distinctions.

Sida caudatifolia. Stem terete, over two feet in height, tomentulose, and villous with spreading white hairs leaves ovate, cordate, serrate-dentate, long-attenuate, somewhat pruinous-pubescent and soft to the touch above, paler and velvety tomentose beneath, about 9-nerved, 5 inches long, 2–3 inches broad, upon villous petioles of nearly equal length; floral leaves lanceolate to linear: lower flowers axillary and solitary; the upper paniculate; pedicels 9–18 lines long: calyx slightly angulate, densely pubescent, not accrescent; segments ovate, acuminate: petals yellow, 4–5 lines long: carpels 5, slightly and bluntly beaked at the apex. — Collected in the barranca of Tequila, 13 October, 1893 (no. 5445).

Dalea filiciformis. Root thick, fusiform, yellow: stems several, much branched, shrubby below, glandular-punctate above: leaves delicate, 8–10 lines in length, 17–37 foliate; leaflets very small, $\frac{2}{3}$ line

in length, oblong, rounded at the apex and base, glabrous, glandular-punctate beneath: spikes elongated, terminal, very loosely flowered; peduncles 2–2½ inches in length; floral rachises as long or longer; bracts ovate, acuminate, glabrous, caducous, 3 lines long: calyx very villous, resinous-dotted between the ribs, 3–4 lines long; the teeth filiform, plumose, much longer than the tube: corolla light-colored with purple glandular dots; keel 4 lines long. — Collected upon limestone hills, Villar, San Luis Potosi, 14 September, 1893 (no. 5472).

DALEA UNIFOLIATA. Slender, smooth, annual, with spreading branches from near the base, a span to a foot in height. stem glandular-punctate: leaves strictly unifoliate; petioles 3–4 lines long; leaflet broadly ovate, truncate or subcordate at the base, rounded at the apex, glandular-crenate; the larger ones 6–7 lines long, equally broad: racemes terminal or nearly so, 2–3 inches long; pedicels ½ line in length: calyx turbinate, finely pubescent with curved hairs along ten promineut nerves, and ciliate upon the margin, nearly 2 lines long: vexillum small, white, much exceeded by the violet wings and keel; the latter about 2 lines in length: ovary apparently but one-ovuled. — Collected in Orizaba by F. Müller, August, 1853 (no. 663), and in dry, thin soil, barranca of Tequila, Jalisco, by Mr. Pringle, 6 October, 1893 (no. 4585). A very attractive and well marked species, which has long been represented in several herbaria by Müller's specimens, for which, we find no description.

TEPHROSIA MACRANTHA. Tall, 6–12 feet in height: branches angled and strongly ribbed, fulvous-tomentose as well as the peduncles and petioles: upper leaves 3–5 inches in length; leaflets 17–23, narrowly elliptic to lance-oblong, obtusish to cuneate at the base, acutish or obtuse and often apiculate at the apex, grayish with a fine appressed pubescence upon both surfaces, tawny upon the midrib beneath, 11–14 lines long, 3 lines broad; petiolules 1 line long: panicles large terminal, of numerous spreading pedunculate racemes (6–9 inches in length); bracts linear-filiform, 4 lines in length, 3-nerved, appressed silky-pubescent; pedicels ascending, 2½ lines long, grouped by 2's and 3's: calyx finely pubescent, campanulate, 3 lines in length, parted to the middle; teeth slender, lanceolate, attenuate: corolla fully 1 inch in length, in the dried specimens lilac; standard orbicular, streaked with green, its slender claw exserted from the shallow tube of the calyx; alæ oblong, oblique at the base; parts of the keel obtusely auricled: free stamen biglandular at the base, as is also the stamineal tube: pods 2–2¼ inches long, deflexed, falcate, tipped with the attenuate style, finely pubescent, 5–10 seeded. — Collected on hills near

Tequila, 5 October, 1893. A highly ornamental species, distinguished by its large flowers, and figured in 'Garden and Forest,' vii. 175.

COURSETIA MOLLIS. A low shrub, 3–6 feet high: branches striate, glabrate, gray; branchlets and petioles glandular-tomentose: leaves 15–21-foliate, 4–7 inches long; leaflets elliptic-oblong, rounded at the apex, apiculate or retuse, soft cinereous-pubescent, 8–11 lines long, 3½–5 lines broad; youngest leaves white, silky-villous; stipules subulate, 1½–2 lines long, villous, persistent as short rigid spines: racemes shorter than the leaves, 1½–3 inches long, few-flowered; pedicels about three lines long: calyx deeply and subequally 5-cleft, 4½–6 lines long, glandular; segments lanceolate acute: corolla 7–9 lines long; the orbicular standard reddish brown in a dried state; the wings and keel yellow: ovary shortly stipitate, glandular-tomentose, about 12-ovuled; pod pubescent, 2–2½ inches long, 2 lines broad, about 7-seeded. — Collected in the barranca of Beltran, 5 June, 1893 (no. 5491).

DESMODIUM SPIRALE, DC. The numerous and varied forms of *Desmodium* which in their technical characters closely agree with this species form one of the most puzzling groups of the genus. A fairly extensive series of specimens from South America, West Indies, and especially from Mexico and New Mexico, goes far to confirm the view expressed by Bentham (Flora Brasiliensis, xv. pt. 1, 105, 106, and repeated by Grisebach, Fl. Brit. W. I. 188) that these closely related forms are better regarded as constituting one polymorphous species. Nevertheless, it is desirable that the chief tendencies of variation should be indicated. The original descriptions of *Desmodium* (*Hedysarum*) *spirale* by Swartz (Prodr. 107), and De Candolle (Prodr. ii. 332), indicate that the type of the species had trifoliate leaves with roundish-ovate leaflets. Of this form specimens from the following localities have been seen: Toscano, Cuba, *Wright* (no. 2319); Jamaica, *Macfadyen*; Porto Rico, *Sintensis* (no. 1981); Tovar, Venezuela. *Fendler* (nos. 1785, 1786); Guayaquil, *Hartweg* (no. 650, *D. sylvaticum*. Benth.); Costa Rica, *Oersted*; Brazil, *Burchell* (no. 9092); and Jalisco, *Pringle* (no. 3882). In all these specimens the pods are very slender and strongly contorted, the segments being only ¾–1 line broad. From this form the following varieties may be distinguished: —

Var. TRANSVERSUM. Low, 6–10 inches high, with spreading branches: leaves small, all or the lower unifoliate; the single terminal leaflets being transversely rhombic, 4–8 lines broad, two thirds as long; the upper leaves with ovate-oblong leaflets: pod very slender and strongly twisted, as in the type. — Collected by Mr. Pringle on

bluffs of a barranca near Guadalajara, 26 September, 1891 (no. 5179), and again on hillsides near the same locality, 6 September, 1893 (no. 4522).

Var. EXIGUUM. Very similar to the preceding, but the leaflets of the 1–3-foliate upper leaves almost linear: segments of the pod a little broader. — *D. exiguum*, Gray, Pl. Wright. ii. 46; Torr. Bot. Mex. Bound. 57. — New Mexico, *Wright* (no. 1010); Santa Cruz, Sonora, *Thurber* (no. 933), and San Jose del Cabo, Lower California, *Brandegee* (no. 145). Although referred to *D. Neo-Mexicanum*, Gray, by Dr. Watson, Bibl. Index, 217, this variety appears to us distinct from that species which has an essentially flat pod and leaflets usually narrow throughout.

Var. ANNUUM. Leaves unifoliate (rarely one or two trifoliate): leaflets broadly ovate. rather large, 1½ inches long: segments of the pod 1½–1¾ lines broad. — *D. annuum*, Gray, Pl. Wright. ii. 46. Referred to *D. spirale* by Watson, Bibl. Index, 218. — New Mexico, *Wright*, (no. 1009 a); Sonora, *Thurber* (no. 934).

Var. BIGELOVII. Leaves chiefly trifoliate, with oblong-lanceolate leaflets (about 1–1½ inches long), one or two of the lowest leaves unifoliate with a small broad leaflet: segments of the pod 1½ lines or more in breadth, slightly twisted. — *D. Bigelovii*, Gray, Pl. Wright. ii. 47. *D. Neo-Mexicanum*, var. *Bigelovii*, Wats. Bibl. Index, 217; referred to *D. spirale* by Grisebach, Fl. Brit. W. I. 188. — New Mexico, *Wright* (no. 1012); Sonora, *Thurber* (no. 955); W. Texas, *Havard* (no. 22); San Luis Potosi, *Parry & Palmer* (no. 181), *Schaffner* (no. 796 in part); S. Arizona, *Rothrock* (no. 663) Lemmon (no. 539); Mexican Bound. Surv. (no. 277); Chihuahua, *Pringle* (no. 612). This variety differs from *D. Neo-Mexicanum* in its broader leaflets and in the somewhat twisted segments of its legumes; from variety *transversum* it differs in its decidedly broader pods, as well as in its generally taller habit and larger leaflets.

PHASEOLUS MONOSPERMUS. Stem slender, twining, light-colored, sparingly pubescent with hooked hairs: stipules ovate, scarcely a line long; petioles slender, 1–1½ inches long; leaflets 3, deltoid-ovate, entire, membranaceous, green on both surfaces, narrowed to an obtuse and mucronate apex, subtruncate at the base, finely ciliated upon the margins and veins, 15–22 lines long, three fourths as broad; stipels minute, spreading: racemes 4–6 inches long; rachis pubescent, florif-erous from below the middle; bracts ovate, obtuse, a line in length; pedicels twice as long, single or in pairs: flowers small, purplish: calyx about a line long, 5-toothed: vexillum 2 lines long, equally

broad, retuse: ovary uniovulate; legume pendulous, somewhat trapezoidal, 1-seeded, membranous, acuminate at the apex, finely pubescent, ciliated on the margin, about half an inch long. — Collected in the barranca of Tequila, Jalisco, 13 October, 1893 (no. 5446). This species is exceptional in *Phaseolus* in possessing 1-seeded legumes, but, differing from this genus in no other regard, should doubtless be referred hither, especially since in the closely related *P. filiformis*, Benth., there are sometimes but two seeds in the pods.

Vigna strobilophora, Rob. (Proc. Am. Acad. xxvi. 167.) Specimens of this plant collected in a barranca near Guadalajara, 25 August, 1893 (no. 4503), furnish the following supplementary characters: stems woody, an inch or more thick, climbing to the tops of shrubs and trees: legumes smooth, 4 inches long, half an inch in breadth, acuminate; seeds ellipsoidal, dark purple, mottled, almost black. This plant has been figured recently in 'Garden and Forest,' vii. 155.

Cæsalpinia Mexicana, Gray, var. pubescens. Branchlets and both surfaces of the leaves when young soft-pubescent: petals beautifully ciliolate with stipitate glands: pod rather short and broad, free from the punctation commonly if not always present in the typical form. — Collected on dry hills near Zapotlan, 25 May, 1893 (no. 5467).

Schizocarpum parviflorum. Stems very slender, furrowed, finely pubescent; internodes elongated: leaves cordate-ovate in outline, denticulate, green and sparsely appressed-pubescent above, slightly paler and more densely appressed-pubescent beneath, varying from 3–5-toothed to deeply 3-lobed; lobes apiculate, the terminal one often considerably exceeding the others: tendrils unequally 2-branched: peduncles pubescent, 3 lines to an inch long: free lobes of the adnate calyx filiform, 1–1¾ lines long: the yellow campanulate corolla 8–12 lines in length, finely glandular-pubescent upon the outer surface, soft pubescent within, ciliolate upon the margin; segments ovate, obtusish, sometimes apiculate, 3(–5)-nerved: filaments about 2 lines in length, equalling the anthers: fruit flask-shaped, nearly 2 inches in length, puberulent. — Collected on talus of cliffs, barranca of Tequila, Jalisco, 3 October, 1893 (no. 4555). Very similar in habit to *S. filiforme*, Schrad., but with flowers about half as large.

Coulterophytum laxum, Rob. (Proc. Am. Acad. xxvii. 169.) A younger specimen, collected in the barranca of Tequila, 6 July, 1893 (no. 5537), shows the following additional characters: flowers yellowish-green; petals broad at the base, abruptly contracted to a slender, incurved tip.

CRUSEA CORONATA. Low: stem purple with spreading branches, nearly or quite smooth: leaves linear, smooth, acute, 5–10 lines long, 1 line wide; margins revolute; stipular sheaths very short, bearing on each side 3–4 often ciliated bristle-formed teeth: flowers sessile, axillary and terminal, single or less frequently in pairs subtended by two bracts with their bristle-toothed stipular sheath: calyx segments linear, acute, 2–2½ lines long: corolla very small, only ¾ line long, 4-toothed at the summit: stamens included, inserted near the base of the corolla tube; filaments slender: stigma 2-cleft; divisions of the fruit short, columnar, minutely hispid, slightly enlarged at the summit and crowned with a row of spreading bristles. — Collected on dry, rocky soil, Tequila, 3 October, 1893 (no. 5424). This species bears a habital resemblance to *C. subulata*, Hook. & Arn., but is well characterized by its crowned fruit.

GYMNOLOMIA PATENS, Gray, var. ABBREVIATA. Stem 3–5 feet high: petioles much shorter than in the type, about 2 lines in length: heads rather closely grouped at the ends of the branches. — Collected in ravines near Tequila, Jalisco, 21 September, 1893 (no. 4595).

GYMNOLOMIA RUDIS, Gray, var. MINOR. Leaves elliptic, smaller than in the type, 2 inches long, ¾ inch broad, reflexed: heads also smaller, but 8 lines broad. — Collected on rocky hills near Tequila, Jalisco, 7 October, 1893 (no. 4584).

VIGUIERA PRINGLEI. Shrubby, 5–10 feet high, scabrous: leaves all but the uppermost opposite, elliptic or ovate, of firm texture, entire or somewhat denticulate upon the strongly revolute margins, 3-nerved and prominently reticulated beneath, 2½ inches long, 12–14 lines broad, green and very rough upon both surfaces, sessile or subsessile, obtuse and mucronate or acutish at the apex, obtuse at the base, translucent-punctate: heads exclusive of the rays about 8 lines in diameter, corymbose; pedicels becoming an inch long in fruit: involucral scales imbricated in about 5 series, linear-oblong, acute, often apiculate, thickened in the middle, the outer regularly shorter: flowers yellow; ligules 10–12, a half-inch in length, 2 lines broad, shortly 3-toothed at the apex: achenes strongly flattened, black, 2 lines long, silky-villous especially upon the margins, with upwardly pointed hairs; aristæ 2, about half the length of the achene; intermediate scales several; empty ray achenes triangular. — Collected in fruit by Mr. Pringle on hills near Zapotlan, 12 May, 1893 (no. 4365). Flowering specimens of the same plant, collected by Dr. Edward Palmer, at Tepic, 5 January to 6 February, 1892 (no. 1979), have been very kindly sent to us by Dr. J. N. Rose of the Department of Agriculture.

ENCELIA MEXICANA, Mort. A noteworthy form of this species, collected in fields and copses about Tequila, September and October, 1893 (no. 4602), has ovate-deltoid unlobed leaves, slender petioles (entirely devoid of the clasping auricular appendages so common in the species), large and long-peduncled heads, elongated and very glandular involucral bracts less villous than in other specimens at hand. While different forms of this species certainly show striking differences in the features mentioned, a series of specimens show that these characters vary quite independently of each other, forming various combinations, so that varieties based upon them could have little more than formal value.

COREOPSIS PETROPHILOIDES. Stem furrowed, light brown, nearly or quite glabrous, leafy above; branchlets angulate, slightly pubescent: leaves simple, lanceolate, acute, incised-serrate, glandular-punctate, $1\frac{1}{2}$–$3\frac{1}{2}$ inches long, one third as broad, slightly pubescent above, smooth and very pale beneath: heads nearly $\frac{1}{2}$ inch long, rather short-peduncled, aggregated in terminal corymbose inflorescences: floral leaves reduced to short linear-oblong entire bracts: outer scales much shorter than the inner; the latter oblong, obtusish: rays deep yellow, $\frac{1}{2}$ inch in length: achenes bi-aristate, strongly ciliated upon the margins, silky-villous upon one face, glabrous upon the other (toward the chaff). — Collected on the Nevado de Colima, 22 May, 1893 (no. 5508). In habit, inflorescence, and heads, very close to *C. petrophila*, Gray, but with undivided leaves much paler beneath.

PEREZIA PRINGLEI. Stem strict, rather stout, herbaceous, pubescent, purplish, 3 feet or more in height: leaves harsh, oblong, obtuse but mucronulate, sessile, cordate-clasping, doubly spinose-dentate, glabrous, and strongly reticulate-veined above, finely pubescent beneath, 3–5 inches long, 1–2 inches broad; the upper ones gradually smaller and acute: heads large, terminal upon short branches springing from the upper axils, and together forming a racemiform inflorescence a foot in length: involucral bracts regularly imbricated in 5–6 series, ovate to lanceolate, acute to acuminate, purplish upon the exposed portion; the inner ones nearly an inch in length: flowers about 50 in each head: corollas purple, 7 lines long. — Collected on hills near Morelia, Michoacan, 22 October, 1893 (no. 5464). This species has somewhat the foliage of *P. rigida*, Gray, but heads much larger and differently disposed.

GONOLOBUS ANGUSTILOBUS. Branches slender, twining, pulverulent, and covered with roughish, spreading pubescence: petioles about an inch long, pubescent; leaves ovate, acuminate, cordate with a deep

narrow sinus, appressed-pubescent above, paler and somewhat pubescent beneath especially upon the veins, 2–2½ inches long, two thirds as broad; margins finely ciliated: peduncles filiform, half to two thirds as long as the petioles, 1-flowered; pedicels about 5 lines long: calyx segments ovate, acute, 2–3 lines long; margin strongly ciliated: corolla rotate, green, a little over an inch in breadth; segments almost linear, narrowed to an obtuse apex, inconspicuously striate, but not reticulated, glabrous on the outside, white-bearded within, near the throat: corona fuscous. — Collected in the barranca of Tepic, 10 October, 1893 (no. 5458).

GONOLOBUS JALISCENSIS. Branches densely and retrorsely pubescent: leaves narrowly oblong, attenuate, abrupt or cordate at the base, appressed-pubescent above, tomentose beneath, 15–20 lines long, 2½–5 lines broad; petioles pubescent, 4–5 lines in length: peduncles short, nodose, 9–14-flowered; pedicels 4 lines long, finely pubescent: calyx segments ovate-lanceolate, acutish, densely pubescent, 1¼ lines in length: segments of the corolla ovate acutish, 1½ lines long, somewhat reflexed, pubescent on the outside, bearded on the upper surface with short white hairs, yellowish green, somewhat striated: crown orange: upper surface of the column brown: follicle fusiform, attenuate; outer surface roughened with fine longitudinal folds minutely pubescent; inner surface light yellow, smooth, and shining. — Collected on dry, rocky hills near Guadalajara, 21 June, 1893 (no. 4402).

GONOLOBUS DIADEMATUS, Edwards. This species, carefully described and figured in the Botanical Register, iii. t. 252 (1817), is referred to Mexico without more definite locality. So far as we know the plant has not since been collected, and its present rediscovery by Mr. Pringle in a barranca near Tepic, 10 October, 1893 (no. 5429), is thus of interest as establishing more accurately its geographic position. While corresponding in essential features to the original characterization and plate, the specimens at hand have 8–11-flowered peduncles, and somewhat larger leaves. The corolla turns nearly black in drying, and Mr. Pringle states that the fruit is distinctly pentangular.

PHYSALIS LEPTOPHYLLA. Stem slightly woody below, herbaceous above, striate, finely pubescent, more or less strongly geniculate, and with spreading branches: leaves ovate, entire, sharply acuminate, unequal, and not attenuate at the base, very delicate in texture, green and nearly glabrous upon both sides, 10 lines to 3½ inches long, two thirds as broad; margins finely ciliated; petioles ½–2½ inches long, glandular-villous: flowers very small, commonly nodding,

springing from the forks of the branches; peduncles but 1–2 lines long: calyx in anthesis 1½ lines long, glandular-villous; teeth short, ovate, acute: corolla apparently white, with dark spots at the base, 2–3 lines long: anthers greenish-blue: fruiting calyx about ½ inch in diameter. — First collected by Mr. W. G. Wright near Mazatlan, January, 1889 (no. 1252); then by Dr. Edward Palmer, at Alamos, September 16–30, 1890 (no. 709, mentioned by Dr. Rose, Contr. Nat. Herb. i. 108), and finally collected by Mr. Pringle in the barranca of Tepic, 11 October, 1893. This species differs from any known to the authors in its very thin, quite entire, exactly ovate and sharply acuminate leaves, as well as in its small subsessile flowers. The following imperfectly described species may well be related: *P. geniculatá*, Miers, which, however, is said to have obtusish leaves and peduncles equalling the petioles; *P. glabra*, Mart. & Gal., which also has peduncles equalling the petioles; and *P. minutiflora*, Moç. & Sesse. with repand acute pruinous leaves.

JACOBINIA STELLATA. Stellate-tomentose: stems ligneous, branched, light colored, not constricted about the nodes: leaves ovate-lanceolate, 1½–4 inches long, two fifths as broad, narrowed to an obtuse apex, cuneate at the base, paler beneath; petioles 5–8 lines long: inflorescences short, crowded, pedunculate in the upper axils, glandular-pubescent; bracts narrowly elliptic, cuneate, foliaceous, 5 lines long: calyx segments linear-oblanceolate, acutish, 1-nerved, 8 lines long, a line broad: corolla 1½ inches or more in length, slender, reddish purple; the lower lip spreading, 6 lines long; the upper erect, a little shorter: fruit glandular-pubescent, a little over a half an inch in length. — Collected under dry cliffs in the barranca of Tequila, 16 October, 1893 (no. 4573). Well characterized by its pubescence.

CARLOWRIGHTIA HAPALOCARPA. Rootstock horizontal, much branched: stems erect, or nearly so, 10–15 inches high, tomentulose and slightly hirsute, with a few longer spreading hairs: leaves short-petioled, ovate, acute, 1–1⅓ inches long, 9–12 lines broad, hirsute upon the veins and margin, paler beneath: flowers in pairs, forming loose subsimple terminal spikes; bracts minute: calyx glandular-pubescent; segments linear-oblong, acutish, 1–1½ lines long: corolla pale purple, nearly ½ an inch in length: anther cells slightly oblique: fruit tomentulose; seeds flat, black, finely tuberculate. — Collected on limestone hills, Villar, State of San Luis Potosi, 14 September, 1893 (no. 5471).

LIPPIA APPENDICULATA. Procumbent, much branched, appressed-pubescent, cinereous: stem short, somewhat ligneous, 1½–2 lines in

diameter, covered with a light-colored cracked cortex; branches slender, flexuous, ascending, a span in length: leaves lanceolate in outline, pinnatifid, plicate, prominently veined beneath, 4–6 lines long, cuneate at the base; the tooth-like segments short, obtuse: peduncles axillary, 1–2 inches in length; spikes oblong, dense, 6–10(–22) lines long, 4 lines in diameter: bracts ovate-lanceolate, acute, ciliated, and pubescent, $1\frac{1}{2}$ lines long: calyx 2-parted, persistent; segments entire or minutely 2-toothed: corolla purplish, much exserted, $2\frac{1}{2}$ lines long, 5-lobed; the ventral lobe somewhat larger than the others: stamens 4, in pairs; the ventral ones with slender erect appendages springing from the connective and exceeding the anthers in length: style short; stigma strictly simple, oblique. — Collected in wet alkaline soil, Mapimi Desert, Durango, 25 November, 1893 (no. 4625). — An anomalous species with the 5-parted corolla and appendaged anthers of *Verbena*, but the 2-cleft calyx and entire oblique stigma of *Lippia*.

CUNILA PYCNANTHA. Stems slender, branching, herbaceous, or slightly ligneous, tomentulose: cortex light brown, peeling off. leaves ovate-lanceolate, long-acuminate, $1\frac{1}{2}$–$2\frac{1}{2}$ inches long, nearly half as broad, rounded or subcordate at the base, short-petioled, serrate except at the base and apex, smooth and dull green above, much paler and glaucous beneath, somewhat tomentose upon the midrib and petiole: flowers very numerous, small, not at all verticellate, but disposed in dense terminal capitate cymes: corolla pubescent upon the outer surface, 2 lines long, little exceeding the pubescent calyx. — Collected on Nevado de Colima, Jalisco, 7,000 feet, 22 May, 1893 (no. 5511). Well characterized by the dense terminal inflorescences, which give the plant a Eupatorium-like habit.

SALVIA PRINGLEI. Shrub, 3–6 feet high, stems essentially smooth, finely striate, branching: leaves ovate, shortly acuminate, rounded or abrupt at the base, serrate, a little over 2 inches in length, $1\frac{1}{2}$–2 inches in breadth, glabrous upon both surfaces; petioles 4–6 lines in length: spikes dense, terminal on the branches, 2–3 inches long; bracts ovate, acuminate, ciliated, and somewhat pubescent, 6 lines long, rather persistent: calyx tubular, 8 lines long, ciliated, pubescent within, 10-ribbed, becoming corrugated and compressed at the throat; the upper lip ovate, acuminate, entire; the lower lip bifid: corolla rose-purple, $1\frac{1}{2}$ inches long; the upper segment very pubescent, $\frac{1}{2}$ inch in length, the lower spreading, about equal in length. — Collected under cliffs of the barranca of Tequila, 2 October, 1893 (no. 4564).

EUPHORBIA DELICATULA, Boiss. This species was described from a Mexican specimen in the herbarium of Pavon, but without exact

locality. The plant has now been rediscovered by Mr. Pringle on shaded ledges in the barranca of Tequila, 14 October, 1893 (no. 4550), thus definitely establishing its geographical position. We are indebted to M. Autran of the Boissier Herbarium for a positive identification of Mr. Pringle's specimens with the type. Some of the leaves show a slight tendency to be 3-lobed and somewhat repand.

Euphorbia Jaliscensis. Glabrous and somewhat glaucous: stem stout, erect, dichotomous, striate: leaves panduriform, dentate near the apex and base, obtuse, paler beneath, $2\frac{1}{2}$ inches long, $1\frac{1}{2}$–2 inches broad, narrowed at the base; petioles 8–10 lines long, flat, striate, purple above and with narrow green margins: glands 4, oblong; appendages narrow, green, 2-parted; divisions bluntly toothed: segments of the involucre fimbriated: capsule large, short-oblong, glabrous, 3 lines long, $2\frac{1}{2}$ lines broad; seeds columnar, tetragonal, mottled, $1\frac{1}{2}$ lines long; caruncle conspicuous, cup-shaped. — Collected in the barranca of Tequila, 26 September, 1893 (no. 4608). A plant with much the habit of *E. Francoana*, Boiss., and *E. cuphosperma*, Boiss., as well as some forms of *E. heterophylla*, L. From all these it is distinguished by its considerably larger capsules.

Phyllanthus Tequilensis. Branches subterete, with a reddish-brown, scaly bark; branchlets more or less distinctly angled: leaves distichous, large, ovate-elliptic, rounded to acute at the apex, rounded at the base, smooth and glaucous upon both surfaces, paler beneath; the larger ones about 4 inches long, 3 inches broad; veins white, slightly prominent beneath; petioles 2 lines long; stipules oblanceolate, obtusish at the apex, cuneate at the base, 4–5 lines long, narrowly white-margined, deciduous: staminate inflorescences chiefly axillary, cymose or cymose-paniculate, many flowered, 1–2 inches long; branches filiform; pedicels 1–$1\frac{1}{2}$ lines long; fertile inflorescences terminal upon short branches, fewer flowered; pedicels a little thicker and longer: calyx of the staminate flower 6-parted; segments broadly oblong, rounded at the apex, inconspicuously pinnately veined, 1 line long; glands 6, often somewhat united into pairs, transversely elliptical, crenate: stamineal column scarcely developed, not at all produced beyond the anthers; anthers only two, 2-celled, transversely dehiscent: calyx of the fertile flower 6–7-parted; segments $1\frac{1}{2}$ lines long; glandular cup 6–7-lobed: styles 3, shortly bifid; mature capsule depressed-globose, shallowly 5-lobed, glabrous, reticulated, $1\frac{1}{2}$ inches in diameter, excavated at the base; seeds ovate in outline, finely striated, 4 lines long. — Collected upon hills about Tequila, Jalisco, 2 July and 2 October, 1893 (no. 5490). This species is reluctantly

added to the group of large-leaved members of *Euphyllanthus*. It differs from *P. glaucescens*, HBK., as described by Kunth and Müller, Arg., in its shorter petioles, smaller leaves, and in the very different form of the stipules; from *P. adenodiscus*, Müll., Arg., in the form of the glands in the sterile flower and in the absence of any conical production of the stamineal column; from *P. laxiflorus*, Benth., in its much shorter inflorescences, as well as in its leaves, abrupt, not acute, at the base. From all these species it also differs in having definitely two and not three stamens.

ACALYPHA ERUBESCENS. An erect, pubescent annual, 6 inches to one foot in height: stems terete, purple, branched, villous with spreading white hairs; lower branches spreading, elongated: leaves ovate, crenate-serrate, obtuse, rounded at the base, 9–14 lines long; petioles 4–7 lines long: sterile spikes small, about 3 lines long on peduncles of nearly equal length; fertile spikes terminal and axillary, dense, short, cylindric, sessile, becoming reddish, 6 lines long, 4 lines in diameter; the lateral ones somewhat smaller; bracts 1-flowered, subequally 7-toothed, villous-pubescent: styles 3, undivided; ovary villous above; seeds ovoid, smooth, black, with a white caruncle. — Collected on limestone hills near Villar, 14 September, 1893 (no. 4538).

TRAGIA AFFINIS. Stems slender, elongated, flexuous as though twining, finely striated, densely pubescent: stipules $1\frac{1}{4}$ lines long; leaves ovate, acute, crenate-serrate, cordate with a deep rounded sinus, green and appressed-pubescent above, paler and more densely pubescent beneath, 2–$2\frac{1}{2}$ inches long, 15–20 lines broad; petioles $\frac{3}{4}$–1 inch in length: racemes loosely flowered, $2\frac{1}{2}$ inches or less in length: calyx of the fertile flower with segments oblong, rounded at the apex, nearly or quite glabrous: capsule depressed globose, hirsute, 3–4 lines in diameter. — Collected in the barranca of Guadalajara, 17 October, 1893 (no. 5474). This plant has the whole habit and many of the technical characters of *T. macrocarpa*, Willd. It differs, however, in its shorter stipules and in the finer and more crenate serration of its leaves, those of *T. macrocarpa* being rather deeply and sharply serrate-dentate.

AGAVE POTOSINA. Roots thickened, fusiform; rootstock bulb-like, an inch or more in diameter, clothed with a thick layer of the broad, scarious, imbricated, persistent bases of the old leaves: fresh leaves few, 4–6; the foliar portion lance-linear, 6 inches long, about 5 lines broad, narrowed to a slender, unarmed tip; the narrow white margins bearing short, soft, spreading truncate or irregularly tipped

teeth (less than a line in length): scape terete, glaucous, 1½–2 feet high, simple, floriferous above the middle; sterile scales about three, lanceolate, attenuate, slightly toothed, 1–1½ inches long; the floral similar, but much reduced above; raceme simple, loosely 12–20-flowered; pedicels 1–1½ lines long: tube of the perianth but 3 lines long, about equalling its narrowly oblong obtusish 9-nerved segments. stamens about 8 lines long: capsule very glaucous, subglobose, 5–6 lines in diameter. — Collected on calcareous mesas, Los Charcos, 2 July, 1891 (no. 3745). This number was distributed last year by an oversight as "*A. brunnea*, Wats. n. sp." Dr. Watson's species, however, was founded upon no. 2218, from which this is quite distinct as to perianth and capsule.

Sisyrinchium Pringlei. Acaulescent, strictly erect, 1–2 feet high: root a dense fascicle of short, thickened fibres: leaves acerose, pungent, 6–10 inches in length, with broad, sheathing bases; the latter persistent, cleaving into fibres: scapes simple, compressed: inflorescences single, terminal, an inch or more in length; spathe of two unequal bracts; the longer exceeding and the shorter about equalling the included flowers; spikelets 2 in each spathe, unequal, 3–5-flowered; flowers enclosed by oblong-lanceolate, acute, scarious-margined bractlets: perianth yellow; segments 4–5 lines long. capsule subglobose. — Collected on dry calcareous hills near Guadalajara, 4 September, 1893 (no. 4520).

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By B. L. Robinson and M. L. Fernald.

Presented May 9, 1894.

Crossosoma parviflora. A shrub, 4–8 feet high: branches covered with gray bark; branchlets slender, elongated, and often flexuous, sometimes straight and a little rigid; cortex yellow: leaves elliptic-oblong, obtuse and mucronulate at the apex, pale green upon both surfaces, thickish, 1-nerved, 4–6 lines long, $1\frac{1}{2}$–$2\frac{1}{4}$ lines broad: sepals 5, broadly oblong or suborbicular, $1\frac{3}{4}$–$2\frac{1}{4}$ lines long: petals 5, oblong, 3 lines in length: stamens 15–20: carpels 3–4; follicles glabrous, reticulated, only 3–$3\frac{1}{2}$ lines long. — Collected in the Grand Cañon of the Colorado, by Dr. Gray, February to May, 1885, but referred to *Glossopetalon Nevadense*, Gray; and at La Tinaja, Sonora, at 3,700 feet, by Mr. Hartman, 19 November, 1890 (no. 245).

Eriodendron acuminatum, Wats. (Proc. Am. Acad. xxi. 418). Specimens apparently of this species, but representing other stages than those shown by the type, were collected in Western Chihuahua but without more exact locality. The older branches are armed with stout spreading spines 3–4 lines in length, while the younger ones, as Dr. Watson states, are unarmed; the young shoots and leaves are densely tomentose: the calyx deeply campanulate, an inch long, shallowly 5-toothed, glabrous and glaucous upon the outer surface, densely sordid tomentose within; teeth rounded, often split (perhaps in drying): petals linear, 5 inches long, 4 lines broad, very appressed silky upon one side of the outer surface, tomentose upon the side covered in the bud; glabrate upon the inner surface: stamens included. — The Mexican name is "Pochate." The fleshy white roots are eaten, the

fine cotton is used for making wicks for tapers of wild beeswax. This species is to be distinguished from *E. tomentosum*, Robinson, by its glabrous calyx and relatively broader leaflets.

ESENBECKIA HARTMANII. A shrub, 6–10 feet high: twigs thick, woody, covered with gray bark, leafy chiefly near the end: leaves simple, alternate, oblong or somewhat obovate, entire, rounded or retuse at the apex, somewhat narrowed below to an obtuse or rounded base, thickish, green, nearly smooth and finely reticulated above, tomentulose and scarcely paler beneath; the largest ones 16–20 lines long, 8–11 lines broad; the others considerably smaller (8–9 lines in length); petioles short, soft pubescent, 1–1½ lines long: inflorescences short, terminal upon the branchlets; fruiting pedicels 1–3 together, ½ inch or less in length: the capsule tuberculately roughened, 9–10 lines in diameter; pericarp white, thin and chartaceous, rather irregularly ruptured upon dehiscence; seeds subglobose, smooth, black, 3½ lines in diameter; scar white, narrow, linear, ½ line in breadth. — Collected in fruit at La Tinaja, Sonora, at 3,700 feet, by Mr. Hartman, 19 November, 1890 (no. 240). This species much resembles the Lower Californian *E. flava*, Brandegee, but differs in its smaller greener shorter-petioled leaves, and its smaller fruit with chartaceous and not cartilaginous pericarp. The seeds of *E. flava* also are larger and have a much broader scar.

ILEX RUBRA, Wats. (Proc. Am. Acad. xxi. 422). Flowering specimens of this species, which was originally described in fruit, have been collected in an arroyo near Coloradas, by Mr. Hartman, May, 1893 (no. 513), and add the following characters: flowers numerous, in small aggregated thyrses, greenish white, 4-parted: calyx lobes ovate, obtuse, ¾ line long: corolla nearly 4 lines in diameter, about equalling the stamens; the lobes rounded.

DALEA LUMHOLTZII. Stems many, slender, puberulent, punctate with yellow glands, simple or sparingly branched, erect from a decumbent much branched suffrutescent base: upper leaves erect or ascending, 1–1¾ inches long, leaflets 17–27, linear, 2–2½ lines long, nearly ½ line in breadth, obtuse, slightly narrowed to very short petiolules, glabrous, glaucous and glandular-punctate upon both surfaces; the basal leaves numerous, shorter, and with considerably smaller almost filiform leaflets, silky under a lens: spikes ovate, capitate, 3–7 lines in length, becoming oblong, very densely flowered, covered with closely imbricated persistent bracts; the latter ovate or obovate, very abruptly pointed, silky upon the margins and especially near the somewhat narrowed base; glabrate and glandular-punctate upon the back,

1½ lines long: calyx striate, sparingly silky, entirely obscured by the bracts: petals white or nearly so, oblong, obtuse, attenuate below to slender claws: stamens 10. — Collected at Las Pinitos, Sonora, at 6,100 feet, by Mr. Hartman, 14 October, 1890 (no. 133). A species with the habit of a *Petalostemon* rather than a *Dalea*; the fresh leaves very aromatic when crushed.

SEDUM LUMHOLTZII. Hoary puberulent: roots fibrous: stems herbaceous, decumbent, 5–10 inches high, ancipital, simple below the spreading cymose inflorescences: leaves soft pubescent and ciliated; the basal ones crowded, spatulate, 4–6 lines long; the cauline spatulate-oblong, obtuse, somewhat narrowed to a slightly extended base, about an inch in length, 2–3 lines broad: flowers numerous, pedicellate, white: sepals lance-oblong, obtusish, 1½ lines long, not at all extended at the base: petals lanceolate, acute, 2½ lines long: carpels 5, pruinose, erect, attenuate; styles persistent; scales small, truncate, bright red; seeds oblong, ¼ line in length. — Collected at Nacory, Sonora, at 3,700 feet, by Mr. Hartman, 4 December, 1890 (no. 287); and at Huchuerachi, Sonora, by Mr. Lloyd, 8 December, 1890 (no. 389).

SICYOS COLLINUS. Stem slender, glabrous, furrowed: tendrils 2–3-parted: leaves thin, 5-lobed, scarcely paler beneath, 1½–2½ inches long, usually narrower, roughened upon both surfaces with minute whitish tubercular hairs; lobes ovate to lanceolate, acute or acuminate, sharply dentate or denticulate; the terminal ones often elongated; petioles 4–12 lines long: ♂ peduncles 1¼–3 inches in length, smooth or nearly so; inflorescences slender, usually simple, slightly puberulent or quite smooth, ½–1½ inches long, 10–35-flowered; pedicels very slender, spreading, smooth, equal, slightly thickened at the apex, 1¾–2 lines in length: calyx teeth very minute or obsolete: corolla rotate-campanulate, 2½–3 lines in diameter, finely granular; lobes broadly ovate, obtusish: stamineal column (including the anthers) ¾ line long: ♀ peduncles 2 lines long, smooth; fruits 2–5 in a head, ovate, acuminate, compressed, nearly 3 lines long, sparingly setose, otherwise nearly glabrous; setæ 1½ lines long. — Collected on hills near Chihuahua, by Mr. C. G. Pringle, 23 October, 1885 (no. 568); and in the Cañon de San Diego, Chihuahua, by Mr. Hartman, 17 September, 1891 (no. 773). A species near *S. Deppei*, Don, but with leaves smaller and somewhat more acutely lobed; peduncles and inflorescences nearly or quite glabrous; petioles and pedicels shorter; and male flowers a little smaller.

GALIUM WRIGHTII, Gray, var. LATIFOLIUM. Pubescent below as

in the type, but the branches nearly smooth: leaves elliptic-oblong, ½ inch long, 2 lines broad: fruit hispid, but the bristles fewer and shorter. — Collected on the Sierra de las Gronillas, Sonora, at 5,800 feet, by Mr. Hartman, 2 October, 1890 (no. 58); the same thing seems to have been collected by Prof. Lemmon near Fort Huachuca, S. Arizona, 1883. Some of Mr. Hartman's specimens show a tendency to intergrade with the type.

BELLIS ORTHOPODA. Perennial: rootstock short, thick, erect, giving off several tough fibres: stems 1–5, decumbent or suberect, 4–5 inches high, simple, monocephalous, appressed pubescent, very leafy to above the middle: leaves thick, entire, appressed pubescent; the radical ones numerous, spatulate, obtuse, 9 lines long, 1½–2 lines broad; the cauline linear-oblong, erect, ciliate, becoming gradually smaller and acutish: peduncles 1–1¾ inches long, appressed cinereous pubescent: heads rather large for the genus, a little over an inch in breadth; involucral bracts lanceolate, acuminate, cinereous pubescent upon the membranaceous margin, 2½–3 lines long: rays about 30, light blue in a dried state, 6 lines long. — Collected at Guachachic, Chihuahua, by Mr. Hartman, 25 June, 1892 (no. 523). This species resembles closely the low and coarse forms of *B. integrifolia*, Michx., but is to be distinguished by its vertical perennial caudex and few simple stems.

ASTER LEPIDOPODUS. Perennial: root a cluster of simple fibres: stems several, slender, a foot high, scaly upon their spreading distinctly decumbent bases, hirsute, simple or bearing several erect slender nearly naked monocephalous branches: reduced basal leaves narrowly deltoid, acute, entire, scarious, glabrate except upon the ciliated margins; foliar leaves of the stem oblong-linear, acutish, entire, erect, nearly an inch in length, 1½ lines broad, glabrous, except upon the strongly ciliated margin and occasionally upon the midrib: heads about an inch in diameter; scales of the involucre 2(–3)-seriate, subequal, linear-lanceolate, acuminate; the dark herbaceous middle portion hirsute: rays 20–25, narrow, pale rose-colored: achenes columnar, hirsute, 4-ribbed. — Collected in pine forests about Chuchuichupa, Chihuahua, by Mr. Hartman, 14 June, 1891 (no. 697). A species apparently of the § *Megalastrum* as regards involucre and achene, but more slender and less rigid in habit than the other species of this group.

FRANSERIA NIVEA. Finely white tomentose or pale cinereous throughout, 1–4 feet high: pubescence persistent except upon the base of the stem: leaves alternate, 2 inches long, somewhat broader, 3-parted to the base; parts deeply pinnately lobed; segments acutish, toothed;

petioles $1\frac{1}{4}$–$1\frac{1}{2}$ inches long, often somewhat winged or lobed near the summit: terminal inflorescences about 2 inches long, rather closely flowered, staminate, except at the very base; inflorescences springing from the upper axils several, very short, chiefly fertile; ♂ pedicels flexuous, 2 lines long, white tomentose and not at all glandular; involucres cinereous, rotate, 2 lines in diameter, unequally 9–10-toothed, 20-flowered; teeth obtuse; ♀ involucres at first ovoid, acute, 2-beaked, 2-celled; spines (scales) about 24, appressed, imbricated; achenes solitary in each cell; fruit $2\frac{1}{2}$ lines long, puberulent and finely glandular, corrugated toward the narrowed base; the spines spreading, $\frac{2}{3}$ line long. — Collected on plains near Casas Grandes, Chihuahua, by Mr. Hartman, 10 October, 1891 (no. 813).

ENCELIA OBLONGA. Fruticose, 2–3 feet high: branches grayish, nearly or quite smooth, finely striated; branchlets glabrous or hirsute, resiniferous: leaves attenuate, subsessile, oblong or oblanceolate, puberulent, green upon both surfaces, scabrously ciliolate-denticulate, rounded or obtuse and mucronate at the apex, cuneate at the base, $1\frac{1}{4}$–$2\frac{1}{2}$ inches long, 6–12 lines broad; veinlets translucent: peduncles solitary, terminal, sparingly hirsute, 2–3 inches in length, with 2–3 reduced leafy bracts and a solitary head about an inch in diameter exclusive of the rays: involucral bracts in two series, subequal, lanceolate, caudate-attenuate, ciliolate, 5–6 lines long: rays 12–15, yellow, nearly half an inch in length: disk corollas with throat cylindrical, 2 lines long, much exceeding the short proper tube and still shorter glabrous limb: achenes $2\frac{1}{2}$ lines long, appressed silky villous and crowned with two weak unequal readily deciduous ciliolated awns; the larger one, on the side opposite the enclosing palea, two thirds as long as the corolla. — Collected on plains near Casas Grandes, Chihuahua, by Mr. Hartman, 10 October, 1891 (no. 812).

LEPTOSYNE ARIZONICA, Gray, var. PUBESCENS. Soft pubescent throughout: leaves tending to have somewhat broader segments: not otherwise differing from the glabrous type. — Collected at Granados, Sonora, at 2,950 feet, by Mr. Hartman, 15 November, 1890 (no. 222); near Huchuerachi, at 4,000 feet, by the same collector, 5 December, 1890 (no. 296); and at Cardovas, Sonora, by Mr. Lloyd, 9 December, 1890 (no. 406).

PERITYLE LLOYDII. Suffruticose, branching from the base, 4–10 inches high, cinereous-pubescent, very glandular and aromatic: branches slender, terete, more or less decumbent: leaves opposite below, subalternate above, ovate-deltoid, acute, somewhat doubly dentate, 8–12 lines long, pubescent upon both surfaces; petioles

slender, 5–9 lines in length: peduncles springing from the upper axils, about 2 inches long, slightly thickened upward: heads large, radiate, 5 lines high, including the rays 9 lines broad; scales of the involucre narrowly linear, $\frac{1}{3}$ line wide, caudate-attenuate, 4 lines in length: ray flowers 18–20, pale yellow; ligules 3 lines long, 3-toothed at the apex; disk flowers including achenes $4\frac{1}{2}$ lines long: style branches of the latter with attenuate hispid appendages, those of the former smooth; achenes oblong, black with thickened white margins, puberulent, scarcely ciliolate, $1\frac{1}{2}$ lines long. — Collected in niches of dry rocks at Badehuache, Sonora, by Mr. Lloyd, 2 December, 1890 (no. 400). A species nearly related to *P. leptoglossa*, Gray, and *P. Palmeri*, Wats.; distinguished from the former by its much more copious pubescence, more attenuate involucral scales, and larger flowers; from the latter by its slender terete branches, and by its achenes which are scarcely ciliolate instead of having a copious ciliation.

CACALIA GLOBOSA. Caudex short, horizontal, giving off numerous fibres: stem simple, flexuous, 8 inches in height, glabrate, except near the somewhat fuscous-tomentose summit: leaves thickish, nearly or quite glabrous, somewhat glaucous, cartilaginous upon the crenate-dentate margins, obtuse, pinnately veined; the radical ones deltoid, $1\frac{1}{4}$ inches long, nearly as broad, cordate with a broad shallow sinus; their petioles $1\frac{1}{2}$ inches long, slender above, dilated below; the cauline leaves for the most part consisting of ovate clasping cartilaginous dentate phyllodia; only the lower ones surmounted by an ovate or deltoid crenate blade: heads about 6-flowered, densely packed together in a globular inflorescence (9 lines in diameter): involucral scales obovate-oblong, 3 lines in length, with ciliate margins and tip, thickened in the middle, especially near the summit: corollas $2\frac{1}{4}$ lines high; the linear lobes little exceeding the tube: pappus sparing. — Collected in a moist meadow, Guachuchic, Chihuahua, by Mr. Hartman, 25 June, 1892 (no. 522).

PHILIBERTIA CYNANCHOIDES, Decsne., var. SUBTRUNCATA. Leaves narrow, attenuate, abrupt at the base or subcordate with a very shallow open sinus and spreading auricles. — Collected at Fronteras, Sonora, at 4,550 feet, by Mr. Hartman, 25 September, 1890 (no. 4). The type both by description and authenticated specimens has deeply cordate and usually broader leaves. No other differences have been noted.

PHACELIA RUPICOLA. Perennial, hirsute, subacaulescent: leaves springing from an elongated thickish ascending caudex, deeply pinnatifid; blade oblong in outline, 2–3 inches long, equalling the

petiole; segments 15–19, broadly oblong, acutish, generally 1–2-toothed upon the lower margin, 5–7 lines long, 2½–4 lines broad; the upper ones approximate; the lower becoming smaller and more or less scattered: inflorescence exceeded by the leaves, loose below, the lowest pedicels being 1½ inches long: calyx lobes oblong-lanceolate, acute, slightly unequal, 2–3½ lines long: corolla pure white, ½ inch in diameter; lobes rounded, cleft half-way to the base; appendages linear, folds free at the tip and forming pairs alternating with the stamens: filaments equalling the corolla, hirsute below: style 2-parted for two thirds of its length and easily divided to the base; ovary hirsute; ovules about 20. — Collected on cliffs in a pine forest of Strawberry Valley, Chihuahua, by Mr. Hartman, 8 June, 1891 (no. 686). A species of the § *Eutoca*.

Lycium retusum. Stems glabrous, smooth, dark brown or grayish, sometimes armed with short slender spines; branchlets divaricate: pulvini white, pubescent; leaves obovate, cuneate, usually retuse, pubescent upon both surfaces: pedicels filiform, glandular-pubescent, 3–5 lines long: calyx tubular, glandular-pubescent, 2½ lines long; teeth triangular-lanceolate, erect, acute, a third as long as the tube: corolla trumpet-shaped, about 4 lines in length; teeth short, retuse, a fourth as long as the tube: style and stamens exserted; the latter unequal; filaments bearded at the base: fruit not seen. — Collected at Opata, Sonora, at 3,450 feet, by Mr. Hartman, 1 November, 1890 (no. 212).

Maurandia (?) geniculata. Densely glandular pubescent and viscid: stems zigzag: leaves distichous, orbicular, cordate, coarsely crenate, 1–2 inches broad, green upon both sides, 5-nerved; petioles spreading, 5–9 lines long: peduncles axillary, ½–1 inch in length, ascending in anthesis, somewhat thickened and recurved in fruit: calyx narrowly campanulate, subequally 5-cleft to near the middle, 6 lines long; segments narrowly ovate, obtusish, 1-nerved, somewhat plaited at the sinuses: style simple, filiform, nearly or quite an inch in length; ovary superior, 2-celled; ovules numerous, upon axial placentæ: fruit capsular, about equalling the calyx; seeds oblong, barely a line in length, two thirds as thick, black, irregularly roughened with relatively large tubercles but not at all winged: corolla and stamens not seen. — Collected on cliffs at Nacory, Sonora, at 3,750 feet, by Mr. Hartman, 1 December, 1890 (no. 272). Closely resembling in foliage and pubescence *M. erecta*, Hemsl., but with a very geniculate stem and wingless seeds. Until the corolla and stamens are discovered the generic position must remain somewhat doubtful.

Mimulus dentilobus. Very pubescent or glabrate: stems slender,

weak, loosely matted, decumbent, much branched, rooting at the joints, 3–6 inches in length: leaves small, suborbicular, broader than long, shallowly sinuate-dentate, cartilaginous margined; the largest 3 lines in diameter, abruptly contracted into a short winged petiole: pedicels axillary, opposite, filiform, 9–12 lines long: calyx in anthesis $2\frac{1}{2}$ lines in length, slightly accrescent and loosely surrounding the fruit: corolla yellow, spotted with purple; lobes fringe-toothed; the median lobe of the lower lip somewhat retuse: anther cells not confluent: capsule compressed, obtusish, $1\frac{1}{4}$ lines in length. — Collected at Nacory, Sonora, at 3,750 feet, by Mr. Hartman, 4 December, 1890 (no. 288); and on the Bavispe River, Sonora, by Mr. Lloyd, 23 December, 1890 (no. 440). Habit of *M. Madrensis*, Seem., but with fringed corolla.

SALVIA RUBROPUNCTATA. Suffrutescent: stems branched, grayish; branches brown, slightly scabrous, pulverulent: leaves ovate-oblong, obtuse or rounded at the apex, abruptly contracted to a cuneate base, finely crenate-serrate, punctate with dark red dots, at first strongly rugose above and white-tomentose beneath, becoming nearly smooth and glabrous; the largest $1\frac{1}{2}$ inches long, half as broad; many smaller ones clustered in their axils: spikes subcapitate, terminal, solitary, or 2–3 together, short-peduncled; floral leaves lanceolate, slightly exceeding the calyx; verticels about 6-flowered, approximate: calyx $2\frac{1}{2}$ lines long, covered with dense bluish wool, obscuring numerous bright scarlet glandular dots; the upper lip shortly 3-toothed; teeth acuminate: corolla blue, 6 lines in length, punctate with red glands; the lower lip about equalling the tube; the upper lanate on the outer surface. — Collected in the Cañon Huehuerachi, Sonora, by Mr. Lloyd, 12 December, 1890 (no. 451). The species appears to belong to § *Erianthæ*. It is noteworthy for the bright red glands which cover all parts of the flower, but are nearly or quite hidden by the enveloping bluish wool.

ARCEUTHOBIUM sp. Staminate plant very robust, 6–7 inches long, profusely branched: stem terete at the base, 5–6 lines in diameter, sheaths short, campanulate, truncate; branches more or less sharply quadrangular, bright yellow: spikes very numerous, short, few-flowered: flowers 3–4-parted; segments obtuse, ovate-oblong, arched over the stamens; the latter inserted near the middle of the segments. — Collected on pines at Pine Ridge Pass, Sonora, at 3.200 feet, by Mr. Hartman, 17 December, 1890 (no. 340).. This interesting plant may be the staminate form of *A. robustum*, Engelm., or of *A. campylopodium*, var. (?) β, Engelm. From the specimens of both species at hand the present plant differs in its considerably greater

size. These species, however, are too poorly known, especially in the staminate forms, to permit satisfactory determination in this case.

FICUS JALISCANA, Wats. (Proc. Am. Acad. xxvi. 150). Additional material of this species, collected at Granados, Sonora, at 3,700 feet, by Mr. Hartman, 15 November, 1890 (no. 217), shows that the plant has leaves often 6 inches long; also fascicled aerial roots a foot and a half (or more) in length.

SPIRANTHES VELATA. Roots clustered, tuber-like: leaves (at least at the time of flowering) none: stems 1–2, erect, 9–12 inches high, thickish and enveloped in loose white scarious brownish-veined ovate-oblong attenuate bracts; the floral bracts similar, smaller but exceeding the flowers: spike dense, oblong, 2–3 inches in length: sepals subscarious; the lateral ones oblong-lanceolate or linear-lanceolate, acuminate, 3-nerved, 4 lines long; the upper one free nearly half its length, attenuate: petals acutish, narrowly ovate, nearly as long as the upper sepal, also subscarious and brownish nerved; lip rhombic, rounded at the tip, crenulate throughout, thickish, about 6 lines long, finely granulated above and bearing two small oblong hoary-pubescent callosities at the base. — Collected in a cañon parallel with the Cañon de los Alamos on Rio San Miguel, Chihuahua, by Mr. Hartman, 28 June, 1891 (no. 710).

BRAVOA DENSIFLORA. Root of many spreading thickened fibres; bulbs loose, oblong, becoming 2 inches long and an inch or more in thickness: radical leaves linear, attenuate, 3–4 inches long, a line wide; the cauline reduced to bracts, 1–2 inches long, with broad scarious and attenuate tips; the floral similar: spike short, dense; flowers single in each bract, slender, tubular, spreading, curved, 17–22 lines long, dull yellow in a dried state, pulverulent-tomentulose upon the outer surface; limb oblique; segments ovate, obtuse, only 1–1½ lines long, erect, bearing a tuft of short white hairs at the tip: anthers inserted high up in the scarcely ampliate throat: fruit (immature) ovate, over 3 lines in diameter. — Collected on dry mesas near Varogachic, Chihuahua, by Mr. Hartman, 5 July, 1892 (no. 536).

PINUS LUMHOLTZII. A tree, 30–40 feet in height: branchlets elongated, ¼ inch in diameter: leaves in 3's, springing from the lower surface of the branchlets, pendulous, 10–13 inches long, ¾ line in breadth, nearly flat and shining upon the dorsal surface, carinate upon the ventral; margins scarcely involute: sheaths quite obsolete: bud scales lanceolate, attenuate, tawny, somewhat lacerate-ciliate, 3½ lines long: aments and cones unknown. — Collected near Coloradas, by Mr. Hartman, May, 1893 (no. 541). A beautiful species, striking

in habit on account of its dense pendulous foliage, and figured in Scribner's Magazine, xvi. 38.

MARSILIA MOLLIS. Closely tufted, densely villous and cinereous throughout; hairs fine, silky, persistent or very tardily deciduous, finely warted under a compound microscope: internodes and stems in the numerous specimens at hand (terrestrial form) not at all developed: root a cluster of delicate fibres: petioles filiform, reddish brown, flexuous, 8–12 lines long, commonly nodding at the apex; leaflets deltoid-obovate, entire, rounded at the apex, broadly cuneate at the base, $1\frac{1}{2}$ lines in length, equally broad: peduncles borne singly but in great numbers and closely crowded, $2\frac{1}{2}$–3 lines long; conceptacles horizontal, broadly oblong, compressed, $1\frac{3}{4}$ lines long, $1\frac{1}{4}$ lines broad, densely white-villous, dull brown on the removal of the pubescence, finely 8–9-wrinkled upon each surface, or smooth, often punctate; rhaphe $\frac{1}{2}$ line in length; basal teeth very obscure; sori 16–18. — Collected at San Diego, Chihuahua, at 6,000 feet, by Mr. Hartman, 20 April, 1891 (no. 604). A very small and remarkably pubescent almost lanate species.

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ART. XVII.—*Contributions from the Gray Herbarium of Harvard University, New Series, No. IX;* by B. L. ROBINSON and J. M. GREENMAN.

I. *On the Flora of the Galápagos Islands, as shown by the collection of Dr. G. Baur.*

WHILE exploring the Galápagos Archipelago in the summer of 1891, Dr. George Baur secured, besides zoölogical specimens, a large collection of plants. The latter have recently been determined at the Gray Herbarium and for various reasons possess considerable interest. They furnish in several cases more copious material of hitherto imperfectly known forms and, as is to be expected, contain a certain number of new species. Furthermore Dr. Baur visited not only all the islands hitherto explored but extended his collecting to no less than eight others, from which, so far as can be learned, no plants have been secured, or at least reported. It is well known not only that the archipelago possesses a peculiar and remarkable vegetation, but that the different islands exhibit in their floras a striking individuality. It has been accordingly a matter of interest to compare the forms of the newly explored islands with those of the others for some time known through the collections of Darwin, Edmonstone, Macræ, Douglas, Scouler, Andersson and Agassiz.

While upon some of the smaller islands Dr. Baur collected only a few species, enough material is at hand not merely to confirm strongly the view that almost every island has its peculiar species and varieties, but to show clearly that even plants, which must pass as the same species, often exhibit, when found upon several islands, more or less striking racial differences. These facts, while in other respects noteworthy, derive a special interest from their relation to the probable origin of the flora of the group. Regarding the fauna Dr. Baur has in several recent articles called attention to peculiar harmonic relations existing between the forms of the different islands, and has argued from zoölogical grounds that the islands must at one time have been united, not only with each other but with the mainland near Central America. This view has been severely criticised by several writers, but no one has attempted to account for the peculiar distribution of differing, yet closely related forms upon the islands, and as the subject is one which merits further attention, it seems worth while to present the botanical data in some detail.

Perhaps no species to be found upon the different islands better illustrates the noteworthy racial divergence in related

forms than *Euphorbia viminea* Hook. fil. This species differs markedly in foliage from any other known member of this large genus, and is characteristic of the Galápagos Archipelago. Being essentially a desert plant, it can subsist even upon those islands of the group which are of low altitude and do not attain the upper regions of moister atmosphere. It was first collected by Macræ upon Albemarle, rediscovered by Andersson on Charles Island, and has now been collected by Dr. Baur upon the following islands: Barrington, Chatham, Southern and Eastern Albemarle, James, Jervis, Bindloe, Tower, and Abingdon. Even the most cursory inspection of the forms from these different islands discloses marked variation in the contour, size, thickness, rigidity, and color of the leaves, as well as in the length of the internodes, color of the stems, etc., while more careful examination shows that these are not mere individual differences, due to chance, state of development, or individual environment, but each form appears in general to be restricted to a single island. Some forms, such as those of Abingdon and Tower Islands, differ rather strikingly from the rest, while others present slighter differences; in a few cases so slight, that a series of careful measurements is necessary to demonstrate their existence. But the examination of a considerable number of specimens, such as those secured by Dr. Baur, shows that the species, as it occurs upon each island, differs in some characteristics, slight or more considerable, from the forms of all or nearly all of the other islands, and furthermore each island appears to have *only one* form of its own.

The question at once presents itself, if this archipelago is composed of islands of elevation, built up from the sea-floor independently by volcanic action, how has such a distribution been effected. If the vegetation has been derived from the mainland by the chance transportation of seeds, it is quite impossible to believe that each island has received a slightly different form of the same species, and we are forced to the much more natural assumption that racial and varietal divergence has come about after the introduction of the species upon the islands. Now, continuing the supposition that these are islands of elevation, the seeds of *Euphorbia viminea* must have reached them in one of two ways; either each of the nine islands, where we know the species now to occur, must have received its seed directly from the mainland or, what is much more natural, seed must have reached one or more of the islands and from these spread to the rest. That the same species should have reached all these islands presupposes a considerable facility of transportation. But as soon as this is granted it is impossible to understand the highly individual development of the forms upon the different islands. For rel-

ative or complete isolation seems necessary to account for the racially divergent floras of the islands; and especially for the occurrence of only one form upon each island. It would thus appear necessary, in accounting for the present distribution, to assume that at one time in the remote past the islands were either united, or at least that the channels which separate them were less formidable barriers to seed-transportation than at present, so that a general distribution of species could have been effected; and that subsequently, as the islands separated, or as the channels through some change of currents, or other cause, became less easily passed, an era of *much* greater isolation of the floras of the different islands came about. The divergence of character of the vegetation would then begin at once and the otherwise unaccountable existence of a single and peculiar form upon each island would be readily intelligible.

While not prepared to make any positive assertion regarding the probable origin of the islands, the authors fail to see in the hitherto generally accepted theory of elevation any satisfactory explanation for the harmonic yet divergent floras of the different members of the group. Upon Dr. Baur's assumption of a former union between the islands, and subsequent separation by subsidence, not only is explanation possible, but the existing flora of the archipelago is just that which would most naturally result from such an origin. A former union of the islands would account at once for the occurrence of identical ancestral species upon the different members of the group, and the subsequent separation give the needed isolation for varietal and racial divergence, while the latter could not have come about if a continual interchange of seed were taking place from island to island.

Regarding a former land-connection with the continent, which would certainly offer much greater geological difficulties, the botanical evidence is still too vague to merit regard. The affinities of the vegetation of the upper, moister portions of the islands are doubtless, as has been assumed, with the floras of Columbia, Central America, Southern Mexico, and the West Indies, while much of the desert flora of the lower regions has doubtless been derived from the arid regions of Chili and Peru. But so far as botanical data are concerned this could have come about either by migration by land or by transportation by oceanic currents and, as the latter still exist, it seems unnecessary to assume the former. However, upon this point the evidence from the vegetation appears to be still wholly indecisive.

The harmonic relation of the floras of the different islands, which, as we have seen, appears to have such an interesting bearing upon the former possible connection of the islands

with each other, is shown not only by *Euphorbia viminea*, but by various other endemic species and groups of species of the same and other genera and orders.

All the Galapageian species of *Euphorbia* for instance, with the exception of *E. amplexicaulis* Hook. fil., form a closely related group, doubtless having a comparatively recent common ancestry; but most of these forms are characteristic of particular islands. The same is eminently true of the different species of *Acalypha*. The *Borreriæ* of the Galápagos Islands also form, for the most part, a close group of very nearly related species, or perhaps better, varieties of one polymorphous species, all of which have probably diverged from a uniform parent stock after the separation of the insular floras from that of the mainland and from each other. Here, however, we find in some instances the same form upon two or more of the islands, as though transportation of the seed had offered somewhat less difficulties than in the case of *Euphorbia viminea*. The peculiar interest which attaches to the individual occurrence of these nearly related forms of various groups upon the different islands, certainly warrants the publication of the following more detailed descriptions and complete list of Dr. Baur's plants.

The forms of *Euphorbia viminea* Hook. fil. are as follows:

Forma Albemarlensis (typica). Internodes 4 to 5½ lines long: leaves of the stem and of the slender elongated branches 2 to 5½ lines long, half line broad, reddish in the dried state and usually paler beneath, linear with dilated rounded rarely retuse tip; margins except near the apex strongly revolute; leaves of the fascicles and scarcely developed branchlets similar but only 1 to 2 lines long and more distinctly retuse at the apex.—Albemarle Island; collected first by Macræ, and again by Dr. Baur on the southern end of the island in July, and on the eastern side in August, 1891.

Forma Jacobensis. Internodes 3 to nearly 6 lines long: leaves of the stems and branches 3 to 6 lines long, half a line broad, scarcely dilated at the apex; fascicled leaves as in the preceding. —Collected by Dr. Baur near Orchilla Bay, James Island, 1891. Distinguished from the last by its slightly longer and less dilated leaves.

Forma Castellana. Internodes 2½ to 4 lines long: leaves of stem and branches 3 to 4 lines long, three-fourths lines broad; a line in width at the dilated apex, truncate and retuse, much firmer and thicker than in any of the other forms, very pale above, whitened beneath; fascicled leaves very short, 1 to 1½ lines long. —Collected on Tower Island, by Dr. Baur, September, 1891.

Forma Chathamensis. Internodes from 3 to 5½ lines long: leaves of the stem and branches 4½ to 7 lines long, half line broad, slightly dilated at the truncate or often retuse tip, pale in the

dried state; fascicled leaves numerous, 1½ to 3 lines long, retuse.—Collected on Chatham Island, lower region, southwest end, by Dr. Baur, June, 1891.

Forma Carolensis. Internodes from 3 to 5 lines long: leaves of the stem and branches 5 to 10½ lines long, narrowly linear, not at all dilated but merely rounded at the tip, more slender petioled than the preceding forms.—Collected on Charles Island, by Andersson, 1852.

Forma Barringtonensis. Closely approximating forma *Albemarlensis* but having leaves commonly longer, 6 to 12 lines in length.—Collected on Barrington Island, by Dr. Baur, July, 1891. Essentially the same form, although much paler, in the dried state, was collected on Bindloe Island by Dr. Baur, September, 1891.

Forma Jervensis. Internodes 3½ to 6 lines long: leaves of the stems and branches narrowly linear, slightly dilated at the tip, 8 to 13 lines long, half a line broad; the fascicled leaves few and much shorter.—Collected on Jervis Island, by Dr. Baur, 1891. Chiefly distinguished from the other forms by its long narrow leaves, which in the dried state are very pale.

Var. Abingdonensis. Internodes from 5 to 10 lines long: leaves of stem and branches 10 to 15 lines long, linear spatulate, very gradually dilated, half a line broad near the base, 1¾ lines broad toward the rounded and indistinctly apiculate apex, pale above, whitened beneath.—Collected on Abingdon Island, by Dr. Baur, 1891. This form is so well-marked as to merit varietal rank.

In specimens of *Euphorbia articulata* Ands., collected on Charles, James, Albemarle and Bindloe Islands, no satisfactory formal or racial differences could be detected. The Acalyphas, with the exception of the new *A. Baurii*, belong to a small group of closely related forms, regarded by Andersson as species; but by Müller Arg. these so-called species are reduced to six varieties of *A. parvula* Hook. fil. From accounts of previous collectors and from numerous specimens in Dr. Baur's collection, it appears that none of these species, as distinguished by Andersson, have a general distribution; while *A. reniformis* Ands., *A. diffusa* Ands., and the typical *A. parvula* Hook. fil. are each confined to a single island. The other species in essentially the same form occur upon two or more islands.

In *Amarantus sclerantoides* Ands. a racial variation has been noted similar to that in *Euphorbia viminea*. The type of the former was collected on Charles Island by Andersson and has narrow linear leaves 3½ to 8 lines long, scarcely a line broad, somewhat dilated at the apex. Two forms collected by Dr. Baur upon Chatham and Hood Islands differ perceptibly in foliage as follows:—

Forma Chathamensis. Leaves shorter and broader at the tip, 2½ to 5 lines long, a little over a line broad at the apex.—Collected on Chatham Island, lower region, southwest end, June, 1891.

Forma Hoodensis. Somewhat nearer to the above form than to the type but with leaves less dilated at the tip.—Collected on Hood Island, July, 1891.

Besides the forms mentioned, Dr. Baur's collection contains the following new or otherwise noteworthy species:

Hydrocotyle umbellata L. A form apparently of this species was collected in the upper region of Chatham Island at the southwest end, June, 1891. It differs from the typical form only in its shallowly repand dentate rather than crenate leaves.

Borreria Baurii. Slender, ascending: stems weak, a foot or so long, branched, terete, slightly woody at base, covered with a grayish cortex below; branches ascending, finely puberulent or nearly glabrous, 4-angled; internodes much exceeding the leaves: the latter sessile, spreading, ovate to ovate-lanceolate, acute, hispid-ciliate on the revolute margins, slightly scabrous or quite smooth above, paler and almost or quite glabrous beneath, 2½ to 3½ lines long, ¾ to 1½ lines broad, acutish and with short pungent mucronation: flowers minute, 3 or 4 in each of the axils of the upper leaves: calyx teeth ovate, acute, hispidulous, erect in fruit, a little exceeded by the corolla: lobes of the latter recurved: throat pubescent: fruit hispidulous: seeds black, strongly concavo-convex, finely pitted, shallowly and longitudinally channeled upon the dorsal surface.—Collected in the lower region of Chatham Island at the southwest end, June, 1891. Most nearly related to *B. ovalis* Ands.

Borreria Galapageia. Stems slender, ligneous, covered with roughish fuscous cortex; branches approximate, ascending, densely pubescent, leafy; internodes short but usually exceeding the leaves: the latter ovate-oblong, 2 to 3 lines in length, 1 to 1½ lines in breadth, with smaller ones fascicled in the axils, obtuse, covered upon both surfaces with dense grayish and somewhat scabrous pubescence; margins strongly revolute; midrib prominent beneath: flowers about 2 in each of the upper axils: calyx-lobes erect, acute, about equalling the corolla, rough-pubescent as is also the fruit.—Collected on Duncan Island, August, 1891. Apparently nearest *B. divaricata* Hook. fil.

Borreria Pacifica. Fruticose: stem terete, ligneous, covered with smoothish grayish brown cortex; branches many, elongated, ascending or widely spreading, mostly simple, with a close fuscous and scabrous puberulence, especially upon the four salient angles; internodes usually considerably exceeding the leaves: the leaves oblong-lanceolate, sessile, acute, mucronate, scabrous above, glabrous or nearly so beneath, 3½–6 (–8) lines long, scarcely a third as broad, and with smaller leaves fascicled in the axils; margins revolute; midrib prominent beneath; stipular sheaths with about 5 setaceous teeth upon each side: flowers 2 or 3

together in the axils: calyx-lobes lanceolate, acute, mucronate, 1 to 1½ lines long, about equalling the corolla: fruit with scattered grayish pubescence.—Collected on Indefatigable Island, south of Conway Bay, August, 1891.

The three species of *Borreria* here described were distributed as *Spermacoce Baurii*, *S. Galapageia*, and *S. Pacifica*, respectively.

ERIGERON TENUIFOLIUS Hook. fil.? Specimens corresponding in most essential characters with Hooker's description (Enum. Pl. Galap., Trans. Linn. Soc. xx, 207), were secured on South Albemarle Island, July, 1891. The leaves, however, are 1½ to 3 inches long and ¾ to 1 line broad, being accordingly nearly twice as large as in the type. Furthermore the tubes of the disk flowers are glabrous. Without a comparison with the type it is impossible to say whether the present plant is identical with it or represents a species new at least to the islands.

An interesting but unfortunately sterile plant collected on Charles Island, is identical with the specimen of Andersson upon which it appears that Steetz based his description of *E. tenuifolius* in Andersson's Om Galapagos-öarnes Veg. 68. It is to be regretted that the present specimens are too imperfect to show the true position of this problematic plant, although they show pretty clearly that it is distinct from Hooker's species.

ACANTHOSPERMUM LECOCARPOIDES. Pubescent throughout and probably viscid: leaves ovate-oblong, irregularly laciniate or shallowly pinnatifid, with obtusely toothed segments, rounded sinuses, and tapering base, slender-petioled, 2 to 4 inches long: peduncles solitary in the forks, slender, 2 inches long: heads three-fourths inch or more in breadth; outer involucral scales about 4, ovate, acuminate, serrate or entire, 3 or 4 lines long, pubescent upon both surfaces; rays yellow, about 5, elliptic-oblong, minutely 3-toothed at apex: fruit (achene invested in inner bract) irregularly turbinate, somewhat compressed laterally, and developed dorsally, finely and densely pubescent and bearing near the summit 4 or 5 slender spreading straight or somewhat hooked spines: style with slender and spirally recurved branches: disk-flowers about 30, glabrous, with filiform empty achene, slender tube, ampliate throat, and 5-cleft limb: style filiform, entire: anthers subsagittate at base: chaff 1½ lines long, irregularly fringe-toothed at apex: disk conical.—Collected on Hood Island, July, 1891; said to be rare, at least upon this island. Although possessing all the important technical characters of the genus, this plant has more numerous disk-flowers than any hitherto known species. Both in this regard and in its outer involucre and foliage it bears a strong resemblance to *Lecocarpus*, a genus peculiar to the Galápagos Archipelago, doubtless nearly related, but with a very different and characteristic fruit.

SCALESIA BAURII. Villous-pubescent: leaves pinnatisect to the middle, ovate in outline, acute, attenuate at the base, resinous-dotted, finely pubescent and slightly scabrous above, pubescent

and somewhat villous upon the midrib beneath, 3 or 4 inches long, half as broad; segments about 7 pairs, irregularly toothed or again somewhat pinnatifid; petioles slender, about an inch long: peduncle solitary, slender, 1½ inches or more in length: head half inch or more broad; involucre campanulate: scales ovate, acutish, strongly pubescent on both surfaces: true ligulate flowers none, the marginal disk-flowers bilabiate and ray-like, bisexual; the others regular, 5-parted, pubescent on the outer surface of the tube: scales of the disk unequally 3-parted and strongly striate.—Collected on Duncan Island, August, 1891. Apparently near *S. incisa* Hook. fil., but differing from the description of that species in its slender peduncle and ovate acutish involucral scales.

ACNISTUS sp. Arborescent shrub: branchlets glabrous, covered with grayish bark, leaf-bearing at their ends: leaves obovate-elliptic, entire, rounded at the apex, 2 to 4 inches long, 1 to 1½ inches broad, attenuate at the base to slender petioles (half inch long), thin, bright green, puberulent and finely punctate above, paler and soft pubescent beneath: pedicels axillary, rather few in a fascicle, filiform,somewhat thickened toward their ends, spreading or pendulous, nearly an inch in length: calyx broadly cup-shaped, about 2 lines long and broad; the limb subentire: corolla funnel-shaped, about an inch long, externally pubescent; throat gradually ampliate; limb 5-lobed; lobes ovate, obtusish, ciliated: stamens inserted a little below the middle of the tube, included: stigma obscurely 2-lobed.—Collected on Chatham Island, June, 1891. Apparently near *A. ellipticus* Hook. fil., but differing in its pubescent leaves and in having a corolla about twice as long as described for that species.

SOLANACEA sp. Densely pubescent herb with habit, inflorescence, and foliage of *Datura:* leaves broadly ovate (in some cases broader than long), open cordate, shallowly sinuate-toothed, 2 to 3 inches in diameter, above green, glabrous or nearly so, under lens finely papillose-punctate, below pubescent upon veins, not paler; petioles pubescent, as long as the leaves: peduncles an inch or so long, axillary, solitary, 1-flowered, deflexed in fruit: calyx short-cylindric from an ovate base, densely pubescent, very obscurely angled, 4 to 5 lines long, persistent in young fruit; the limb of 5 erect unequal linear teeth: corolla funnel-formed; tube rather slender, 1½ inches long including the but slightly ampliate throat; limb spreading, very shallowly 5-lobed, inch in diameter: anthers longitudinally dehiscent: young fruit ovoid, smooth, 3 or 4 lines in length, loosely surrounded by the calyx.—Collected on Hood Island, July, 1891. A plant certainly new to the flora of the islands and of interesting, apparently somewhat anomalous generic affinities, possessing on the one hand the corolla, smoothish fruit, and more or less persistent calyx of *Nicotiana*, but the leaves, axillary inflorescence, and general habit of a *Datura.* Insufficient material prevents a more accurate disposition.

VERBENA GRISEA. Densely and somewhat sericeously grayish tomentose, in parts brownish or ferrugineous in dried state: stem

tetragonal, somewhat furrowed; internodes in specimens at hand considerably exceeding the leaves: the latter all opposite, petiolate, bipinnatifid, ovate or deltoid in outline, an inch or more in length; rhachis and segments very narrow, not a line in width, frequently curled, obtusish, so densely pubescent as to obscure completely the venation on both surfaces: inflorescence branched; flowers small, in slender loose elongating spikes; central spike floriferous almost from base; the others more or less pedunculate; bracts small, subulate, pubescent, $\frac{1}{3}$ to $\frac{2}{3}$ the length of the calyx: the latter cylindrical, a line long, hirsute-pubescent on the outer surface, 5-ribbed; limb very shallowly and obtusely 5-toothed: corolla nearly twice as long as the calyx, unequally 5-lobed, pubescent in the throat; segments rounded at the apex: anthers unappendaged.—Collected on Duncan Island, August, 1891. A species of § *Leptostachya* and with much the habit of *V. remota* Benth., but differing in pubescence and foliage.

ALTERNANTHERA RIGIDA. Fruticose, copiously and densely branched: cortex light yellow, lucid: branches opposite, rigid, spreading or divaricate; internodes short, glabrous or nearly so: leaves opposite and proliferous in their lanate axils, very small, subulate, pungent, entire, smooth and green, about two lines in length, three-fourths line in breadth at the sessile base: spikes capitate, ovate or oblong, terminal upon the branchlets, 4 to 6 lines in length, about 3 lines in diameter, bright white, slightly villous in the axils of the bracts, otherwise glabrous: bracts ovate, acute, two-thirds the length of the flower, white and scarious; bractlets 2, ovate-lanceolate, somewhat falcate, equalling the calyx: stamineal tube about as long as the antheriferous processes; sterile processes none: stigmas 2, erect, obtuse.—Collected on James Island, on Orchilla Bay, August, 1891. A noteworthy plant differing much in its erect firm habit and rigid subulate leaves from any species known to the writers.

FRŒLICHIA JUNCEA. Stem woody below, profusely branched above; branches opposite, ascending, slender, terete, finely striate, puberulent or glabrous; internodes elongated: leaves reduced to minute scales, scarcely half line long, ovate, acute, scarious toward the edges: inflorescence terminal, loosely spicate, slender and flexuous, 1 to $2\frac{1}{2}$ inches long; flowers sessile, scattered, solitary in alternate bracts; the lowest still more remote; bracts short, broader than long, obtuse, half line long, slightly if at all pubescent; bractlets broadly ovate, retuse, glabrous, scarious: calyx deeply 5-parted, in fruit ovoid, ribbed, slightly compressed, firm in texture, dark colored, a line long; divisions oblong-lanceolate, obtusish, scarious-margined: stamens included; anthers slightly exceeding the alternating obtusish sterile lobes of the stamineal tube.—Collected on South Albemarle and Barrington Islands, July, 1891. A species with the juncoid habit of *F. nudicaulis* Hook. fil., but differing much in its elongated scattered inflorescence, glabrous bractlets, etc. A doubtful and entirely sterile specimen was also collected on East Albemarle.

EUPHORBIA GALAPAGEIA. Ascending, a span high: stems slender, branching from near the base, terete, brown, under a lens finely and densely pubescent; cortex pealing off below; branches rather short, very slender, alternate, ascending: leaves opposite, glabrous, mostly erect, essentially entire, oblong, obtuse or roundish at the apex, obliquely cordate at the base, short-petioled, 3 to 6 lines long, half as broad, somewhat pellucid in the interstices of the veins; stipules minute, lanceolate, somewhat fringed: involucres alternately fascicled in the upper axils, on very short pedicels, very small, one-third line long; glands 4, unappendaged, not dark-colored: capsule ovate; cells finely crested upon their rather sharp dorsal keels, half line long; the three styles short, bifid; seeds yellowish-brown, finely sculptured.—Collected on Charles Island, June, 1891. A species with the habit of *E. flabellaris* Ands., but more slender: leaves mostly smaller, stem and fruit pubescent, glands smaller and not dark-colored, and styles much shorter.

EUPHORBIA NUMMULARIA Hook. fil. var. GLABRA. Glabrous throughout and somewhat glaucous: leaves nearly all unequally 2-lobed with an oblique sinus between the lobes: seeds slightly longer and a little more decidedly angled than in the type.—Collected at Cuevas Bay, Charles Island, July, 1891.

ACALYPHA BAURII. Herbaceous: stem and petioles densely pubescent-tomentose: leaves ovate, short-acuminate, rather regularly and somewhat doubly crenate-dentate, appressed-pubescent upon both surfaces, especially upon the veins beneath, 1½ to 3 inches long, two-thirds as broad, 5-nerved from the truncate or subcordate base; petioles ascending, 1 to 2 inches long; stipules small, subulate-setaceous: spikes axillary, slender, 2½ inches in length, androgynous; pistillate involucres commonly solitary, 2-flowered, sessile near the base of the spike, the slender staminate portion of the spike about a line in diameter, flexuous, loosely flowered below; rhachis densely grayish pubescent: bracts of the fertile flowers broadly ovate, somewhat unequally 9-dentate, cleft a third of the way to the base, villous, 2½ to 3 lines long, 4 lines broad: calyx deeply 3-cleft; segments ovate, acute, ciliate: styles laciniately many-cleft; capsule villous, nearly a line long; seeds ovate, very finely pitted.—Collected on the southwest end of Chatham Island, June, 1891. A single detached perhaps terminal inflorescence has several fertile involucres.

ARISTIDA VILLOSA. Annual: root a cluster of short delicate fibres: culms several, slender, ascending, nearly a foot in height; internodes minutely puberulent under a lens: blade of leaves thin, flat, narrowly linear, 2 to 5 inches long, 1 to 1¼ lines broad, also finely puberulent and slightly scabrous and hispid upon both surfaces; sheaths conspicuously silky-villous with soft white spreading hairs except near the base; the summit covered with more densely tufted hairs; ligules laciniately ciliate: panicles 1½ to 3 inches long, condensed and subspicate, 4 lines in diameter; lowest branchlets scarcely imbricated: sterile glumes nearly equal, lan-

ceolate to linear, attenuate, shortly aristate, 3 lines long, closely puberulent, ciliate upon the keel; spreading aristæ of the flowering glumes 2 to 5 lines long; rhachis and rhachillæ finely puberulent.—Collected on Jervis Island, August, 1891.

LEPTOCHLOA ALBEMARLENSIS. Decumbent: culms 8 to 12 inches or more in length, slender, much branched, geniculate below; branches approximate, ascending; internodes glabrous, short: leaves somewhat scabrous; blade lance-linear, acute, divaricately spreading, 8 to 12 lines long, about a line broad; sheaths sparsely pilose with delicate white spreading hairs: panicle with slender alternate nearly divaricate branches (4 to 10 lines long); spikelets closely appressed, somewhat imbricated, $2\frac{1}{2}$ to 3 lines long, with about three perfect flowers and rudiment: sterile glumes somewhat unequal; the outer and larger one $2\frac{3}{4}$ lines long, acute, exaristate; flowering glumes $1\frac{1}{2}$ lines long, 3-nerved, slightly bifid and tipped with short awn, sometimes ciliate.—Collected on South Albemarle Island, July, 1891. From character this must be near *A. brachiata* Steudel.

The following is a complete list of Dr. Baur's plants. Those species which appear never to have been previously reported from the Archipelago are marked with an asterisk (*), and the new plants with a dagger (†). The Lichens have been determined by Miss Clara E. Cummings.

NAMES OF PLANTS.	Chatham.	Charles.	Albemarle.	Hood	Duncan.	Indefatigable.	Jervis.	Barrington.	James.	Bindloe.
Cissampelos Pareira Linn.	×	×								
Drymaria cordata Willd. (=? *D. glaberrima* Bartl.)	×									
Polygala oborata Hook. fil. (forma *latifolia*)		×								
" *puberula* Ands.						×				
" *Galapageia* Hook. fil.	×	×	×							×
" *insularis* Bennett	×					×	×			
Anoda acerifolia DC.		×								
Sida paniculata L.		×								
" *rhombifolia* L.	×	×				×				
Abutilon Andersonianum Garcke. ?								×		
Gossypium Klotzschianum Ands.	×		×	×				×		
Waltheria reticulata Hook. fil.		×	×			×	×	×		×
Oxalis corniculata L.	×									
" *carnosa* Molina					×					
" *Agassizi* Rose		×		×		×				
Tribulus sericeus Ands.		×								
Xanthoxylon Pterota HBK.	×									
Castela Galapageia Hook. fil.	×	×	×		×		×			×
Maytenus oboratus Hook. fil.	×	×	×	×			×	×		
Discaria pauciflora Hook. fil.	×		×					×		
" sp.				×						
Cardiospermum corindum L.	×		×							
Sapindus (near *S. acuminatus* Willd.)			×							
Dodonæa viscosa Jacq.			×							
Spondias Edmonstonei Hook. fil.			×							

Names of Plants.	Chatham.	Charles.	Albermarle.	Hood.	Duncan.	Indefatigable.	Jervis.	Barrington.	James.	Bindloe.
Crotalaria puberula Hook. fil.	×									
Dalea parrifolia Hook. fil.		×				×			×	
" *tenuicaulis* Hook. fil.			×							
Tephrosia litoralis Pers.	×									×
**Stylosanthes scabra* Vog.		×				×	×			×
**Desmodium incanum* DC.	×									
" *molle* DC.		×		×		×	×			
* " *uncinatum* DC.	×									×
* " *spirale* DC.									×	
**Erythrina velutina* Willd.										
Phaseolus semierectus L.	×	×								
" *mollis* Hook. fil.							×			
Rhynchosia minima DC.								×		×
**Cæsalpinia Bonducella* Fleming			×							
Parkinsonia aculeata L.	×	×	×	×	×					
Cassia occidentalis L.	×									
Prosopis dulcis Kth.	×									
Neptunia Surinamensis Steud.	×	×				×	×			
Desmanthus depressus Benth. and Hook.	×			×						×
Acacia tortuosa Willd.										
" *macracantha* Benth. and Hook.		×				×				
**Miconia* sp.	×									
Mentzelia aspera L.	×	×								
Passiflora fœtida Cav.	×									
" *suberosa* L. var.				×						
**Momordica Charanta* L.			×							
Sesuvium Edmonstonei Hook. fil.								×		
Trianthema monogyna L.		×								
Mollugo flavescens Ands.	×	×	×							×
" *gracillima* Ands.										
**Hydrocotyle umbellata* L.	×									
Spermacoce tenuior Linn.	×									
**Borreria* (*Spermacoce asperifolia* Mart. and Gal.?)	×									
† " *Pacifica* Rob. and Greenm.						×				
† " *Baurii* Rob. and Greenm.	×									
† " *Galapageia* Rob. and Greenm.					×					
" *divaricata* Hook. fil.		×								
" *suberecta* Hook. fil.			×							
" *ericæfolia* Hook. fil.		×	×							
" *dispersa* Hook. fil.	×	×								
" *linearifolia* Hook. fil.			×							×
Psychotria rufipes Hook. fil.	×									
" *angustata* Ands.				×						
Ageratum conyzoides Linn.		×								
Erigeron tenuifolius Steetz non Hook. fil.		×								
" *tenuifolius* Hook. fil. ?			×		×					
" sp.		×								
**Baccharis Pingræ* var. *angustissima* DC.			×							
Lecocarpus pinnatifidus Dcne.		×								
†*Acanthospermum lecocarpoides* Rob. and Greenm.				×						
**Eclipta alba* Hassk.	×									
Scalesia Darwinii Hook. fil.		×								
† " *Baurii* Rob. and Greenm.					×					
" *decurrens* Ands.			×							
Blainvillea rhomboidea Ands.		×		×	×					

Names of Plants.	Chatham.	Charles.	Albemarle.	Hood.	Duncan.	Indefatigable.	Jervis.	Barrington.	James.	Bindloe.
Macrœa laricifolia Hook. fil.	×	×								
Bidens leucantha Willd.	×									
Porophyllum ellipticum Cass.	×	×		×			×		×	
Pectis gracilis Hook. fil.	×	×					×	×		
" *tenuifolia* DC.			×							
" *linearis* Ands.						×				
Plumbago scandens Linn.		×	×		×					
Vincetoxicum ?		×	×							
Cordia lutea Lam.	×	×		×	×		×	×		×
" *Scouleri* Hook. fil.	×									
" sp.					×					
" *linearis* Hook. fil.		×	×							
" *scaberrima* Ands.			×			×				
" *leucophlyctis* Hook. fil. ?									×	
Coldenia (*Galapagoa*) *Darwinii* Hook. fil.			×			×			×	×
" " *fusca* Hook. fil.	×			×						
Tournefortia psilostachya Cham.				×						
" *pubescens* Hook. fil.			×		×					
" *strigosa* Ands.			×							
" *rufo-sericea* Hook. fil.			×							
" *opaca* Ands.	×									
Heliotropium Curassavicum L.	×									
" *parviflorum* L.	×	×			×					
Ipomœa acuminata R. and S.	×									
" *pentaphylla* Jacq.				×		×	×			
" *Kinbergi* Ands.						×	×			
Evolvulus simplex Ands.	×	×								
" *glabriusculus* Choisy	×	×								
Cuscuta gymnocarpa Englm.			×							
**Solanacea*				×						
Lycopersicum esculentum Willd.			×	×						
Solanum nigrum Linn.			×		×					
Physalis pubescens Linn. (=? *P. angulata* L.)	×	×								
Capsicum annuum Linn.	×									
Acnistus n. sp. ? (near *A. ellipticus*)	×									
Lycium ?				×						
Scoparia dulcis Linn.		×								
Capraria biflora Linn.		×								
Lantana peduncularis Ands.		×	×		×		×			×
Lippia rosmarinifolia Ands.			×							
* " *nodiflora* Michx.	×	×								
" ?			×							
Bouchea sp.		×								
Verbena littoralis HBK.		×								
† " *grisea* Rob. and Greenm.			×							
Clerodendron molle HBK.	×	×	×							
Avicennia tomentosa Linn.		×								
Hyptis spicigera Lam.						×				
Salvia occidentalis Sw.	×	×								
Teucrium inflatum Sw.	×									
Boerhaavia hirsuta Linn.	×	×								
Cryptocarpus pyriformis HBK.		×		×				×	×	
Amarantus squarrulosa (Gray) U. and B.							×			
" *Caraccasanus* HBK.			×							
" *sclerantoides* Ands.	×			×						

Names of Plants.	Chatham.	Charles.	Albermarle.	Hood.	Duncan.	Indefatigable.	Jervis.	Barrington.	James.	Bindloe.
Telanthera vestita Ands.						×				
" *angustata* Ands.	×		×							
" *nudicaulis* Moq.			×	×					×	
" *echinocephala* Moq.	×		×	×	×					
" *flavicoma* Ands.	×			×						
†*Alternanthera rigida* Rob. and Greenm.									×	
" *frutescens* R. Br.	×									
†*Frœlichia juncea* Rob. and Greenm.			×							
**Peperomia* sp.	×									
Viscum Henslovii Hook. fil.	×									
Euphorbia nummularia Hook. fil.	×									
† " " var. *glabra* Rob. and Greenm.		×							×	×
" *articulata* Ands.		×	×				×			
" *diffusa* Hook. fil.		×				×				
† " *Galapageia* Rob. and Greenm.										
" *flabellaris* Ands.										
" *punctulata* Ands.				×	×					
" *viminea* Hook. fil.	×		×				×	×	×	×
Phyllanthus Caroliniensis Walt. (=? *P. obovatus* Muhl.)	×									
Croton Scouleri Hook. fil.	×			×				×		
" *incanus* Ands.		×								×
" *Macræa* Hook. fil.			×						×	
" *Xalapensis* HBK.	×									
†*Acalypha Baurii* Rob. and Greenm.	×									
" *parvula* var. *flaccida* Müll. Arg.					×					
" " *procumbens* "	×	×								
" " *genuina* "			×							
" " *pubescens* "		×			×	×	×	×		×
" " *cordifolia* " ?							×			
" " *strobilifera* "	×		×							
Fleurya æstuans Gaud. var. *tuberculata* Wedd.			×							
Pilea sp.	×	×								
**Tillandsia* sp.					×					
Hypoxis erecta Willd.	×									
Commelina agraria Kunth.					×					
Cyperus rubiginosus Hook. fil.	×			×	×					
" *brachystachys* Hook. fil.		×	×							
" *Mutisii* var. *plenus* Ands.	×									
* " *fugax* Liebm.	×									
* " *tristachyus* Böckl. ?	×									
**Kyllingia cæspitosa* Nees.		×								
**Dichronema leucocephala* Michx.	×									
**Hemicarpha subsquarrosa* Nees.	×									
**Scleria pratensis* Lindl.	×									
Paspalum conjugatum Berg.	×									
" *canescens* Ands.			×						×	
" *vaginatum* Sw. ?										
Panicum hirticaulon Presl.				×						
" *fuscum* Sw.		×								
Oplismenus setarius Presl. (=? *O. Colonus* HBK.)	×									
Setaria Antillarum Kunth.	×									
Cenchrus platyacanthus Ands.				×						
" *granularis* Ands.		×								
" *distichophyllus* Griseb. ?				×						

Names of Plants.	Chatham.	Charles.	Albemarle.	Hood.	Duncan.	Indefatigable.	Jervis.	Barrington.	James.	Bindloe.
**Stenotaphrum Americanum* Schrank.	×									
Anthephora elegans Schreb.	×	×								
Aristida caudata Ands.						×				
" *dirulsa* Ands.										×
" *subspicata* Rupr. and Trin.			×					×		
† " *villosa* Rob. and Greenm.							×			
**Chloris* sp.		×								
* " *radiata* Sw.		×								
Eutriana pilosa Hook. fil.			×				×			
Eleusine Indica Gærtn.	×									
* " *Ægyptiaca* Pers.				×						
Leptochloa Lindleyana Kunth.			×							
† " *Albemarlensis* Rob. and Greenm.			×							
Eragrostis ciliaris Link.	×	×							×	
Poa megastachya Koel.								×		
**Alsophila* sp.	×									
Adiantum Henslovianum Hook. fil.	×									
Cheilanthes microphylla Sw.	×									
Pteris pedata Linn.	×	×								
" *aquilina* L. var. *caudata* H. and B.	×									
Blechnum occidentale L.	×									
**Asplenium cicutarium* Sw.	×									
* " *farinosum* Willd.		×								
* " *auritum* Sw.	×									
Aspidium molle Sw.		×								
**Nephrolepis cordifolia* Presl.	×									
Polypodium Paradiseæ Langsd. and Fisch.	×									
* " *squamatum* L.	×	×				×				
**Gymnogramme leptophylla* Desv.		×								
* " *calomelanos* Kaulf.	×									
Acrosticum aureo-nitens Hook.		×								
**Lycopodium clavatum* L.	×									
Frullania atrata Nees.	×									
Roccella fuciformis (L.) Ach.		×	×	×						
" *intricata* Mont.		×								
Ramalina sp.		×	×	×						
" *Usneoides* (Ach.) Fr.		×								
Usnea barbata (L.) Fr.	×									
Theloschistes chrysopthalmus (L.) Norm. var. *flavicans* Wallr.	×									
**Zonaria lobata* Agh.	×									

The following species were collected on islands not mentioned in the above list; from Abingdon Island, *Borreria oralis* Ands. (form), *Telanthera echinocephala* Moq., and *Euphorbia viminea* Hook. fil.; from Gardner Island, *Bastardia viscosa* HBK., and *Xanthoxylon Pterota* HBK.; from Tower Island, *Waltheria reticulata* Hook. fil., *Lantana pedunculares* Ands., *Euphorbia amplexicaulis* Hook. fil., *Euphorbia viminea* Hook. fil., *Croton Scouleri* Hook. fil., and *Eragrostis ciliaris* Link.

II. *New and Noteworthy Plants chiefly from Oaxaca collected by Messrs. C. G. Pringle, L. C. Smith and E. W. Nelson.*

MAPPIA MEXICANA. A shrub, 5 feet in height: branches covered with a light grayish cortex, roughened by many small white lenticels: leaves oblanceolate, short-acuminate to an obtuse tip, cuneate at the base, 3½ to 4½ inches long, 1 to 1¼ inches broad, subcoriaceous, green and glabrous upon both surfaces; midrib prominent beneath; the lateral veins upon the lower surface each with a minute cavity just above the base; petiole puberulent, canaliculate, 4 lines long: flowers 4-5-parted, borne near the ends of the branches in short axillary pedunculate appressed-pubescent panicles (an inch or more in length): calyx minutely pubescent; teeth acutish: petals oblong, 1¼ lines in length, half line broad, entirely glabrous upon both surfaces, obtuse, mucronulate with incurved tip: disk shallowly lobed, glabrous upon both surfaces; ovary and style glabrous.—Collected by C. G. Pringle, in lowlands about Micos, San Luis Potosi, 8 December, 1891 (No. 5494). This plant agreeing rather closely both in habit and essential floral characters with *M. racemosa* Jacq. differs from any known species of *Mappia* in its glabrous petals. The genus appears to be new to Mexico.

MIMOSA MINUTIFOLIA. Branches smooth, grayish, often striated with brown, armed with two kinds of reddish brown spines; the stipular spines in pairs, straight, about 2 lines long; each internode also bearing a single strongly recurved spine: leaves cinereous, bipinnate, oblong in general outline, about an inch in length; petiole a line long; rhachis minutely winged, armed beneath with small spines; pinnæ 15 to 22 pairs, 2 lines in length; leaflets 10 to 20 pairs, elliptical, very minute, half line long, about two-thirds as broad, smooth and cinereous above, very minutely pruinous on lower surface, ciliated on the margin: peduncles solitary, half inch in length, finely pubescent; heads globose: calyx three-fourths line long; segments oblong, obtusish, two-thirds as long as the tube, somewhat thickened at the apex: pods oblong, narrowed at both ends, 14 to 18 lines long, 3 to 4 lines broad, cinereous-tomentose, and densely covered on the surfaces as well as the margins with weak straw-colored spines.—Fruiting specimen collected by C. G. Pringle, on rocky hills near Rio Blanco, Jalisco, 26 May, 1891 (No. 5142). This species belongs to the *Acanthocarpæ* and is most nearly related to *M. flexuosa* Benth. and *M. acanthocarpa* Benth. It is well characterized by its finely divided foliage. In each pinna the rhachis is provided with groups of minute dark-colored glands scarcely visible except under the compound microscope.

SEDUM CALCICOLA. Perennial, procumbent, nearly or quite smooth: stem nearly terete, somewhat ligneous near the base; the floriferous branches 8 to 12 inches high: leaves scattered, the lower oblong-lanceolate, acutish, 6 to 8 lines long, 3 lines broad; the upper thick, terete; nearly half inch long, falling off at touch: inflorescence terminal of about three divergent racemes; the lat-

ter 1½ to 2 inches long; pedicels less than a line in length: sepals green, oblong, obtusish, 1¼ lines long: petals lanceolate-attenuate, 2½ lines long: scales short and broad, truncate: stamens 10: carpels 5, united a third of their length, attenuate, many-ovuled, as long as the petals.—Collected by C. G. Pringle, on limestone ledges, Las Cuevas, San Luis Potosi, 30 October, 1891 (No. 5101). Habit of *S. Bourgæi* Hemsl. and from the character also of *S. Guatemalense* Hemsl. From the former it differs in its shorter sepals and shorter and much broader scales: from the latter in its much shorter pedicles, smaller flowers, and broader leaves.

Passiflora Pringlei. Stem angulate, hispid with dark colored hairs: tendrils none: leaves 5-lobed to the middle, somewhat narrowed at the base, about 2 inches in diameter, finely pubescent above, paler beneath and sparingly pubescent upon the prominent reticulated veins; lobes ovate, acutish, finely ciliated, entire or more frequently sharply few-toothed; the middle lobe bearing upon the under surface near its base two small round sessile glands; petioles ascending, 6 to 9 lines long, hispid, bearing two stipitate glands at the summit; stipules lanceolate, acuminate, falcate, 2 lines long: peduncles somewhat exceeding the petioles, hispid, bearing 2 to 3 successive linear attenuate bracts and a single terminal flower (2 inches in diameter): calyx-tube broadly campanulate; lobes oblong-lanceolate, acute, 10 lines long, 3 lines broad, greenish white in a dried state: petals oblong-lanceolate, two-thirds as long as the sepals: outer crown of filaments free to the base, exceeding the petals; the middle crown membranous, plicate, inflexed, covering two inconspicuous inner rings: gynandrophore 5 lines long, glabrous, destitute of any fleshy urceola.—Collected by C. G. Pringle, on hills near Patzcuara, Michoacan, 23 July, 1892 (No. 5268).

Piqueria serrata Gray, var. angustifolia. Shrubby, 3 to 6 feet high: leaves oblong-lanceolate, finely and rather remotely crenate-serrate, 4 to 5 inches long (including short petiole), 6 to 10 lines broad, gradually narrowed at the base.—Collected by C. G. Pringle, on the Sierra de San Felipe, altitude 9,500 feet, 24 September, 1894 (No. 4827).—With habit and floral characters of the type but differing rather strikingly in the outline and serration of the leaves.

Oaxacania n. gen. of *Compositæ* (*Ageratææ*). Heads homogamous, many-flowered. Involucre campanulate; bracts 4–5-seriate, 3-nerved, the outer shorter. Receptacle convex, chaff-bearing throughout. Corollas equal, regular, purplish, with slender tube, somewhat dilated above, and 5-toothed limb. Pappus obsolete or an inconspicuous crown of minute teeth. Achenes linear-oblong, 5-angled and rather strongly compressed laterally.—Bushy herbs or suffruticose. Leaves alternate, petiolate, dentate, palmately-nerved. Heads corymbose-paniculate, about 100-flowered.

O. malvæfolia. Densely and viscidly glandular-pubescent: stems branching, 3 to 4 feet long, very leafy: leaves varying

greatly in size, the larger an inch in diameter on petioles of equal length; the blade cordate, orbicular in outline; the margin shallowly and palmately sinuate-lobed and lobes toothed: heads 8 to 9 lines in diameter.—Collected by C. G. Pringle, growing in crevices of dry cliffs, Tomellin Cañon, Oaxaca, altitude 3,000 feet, 22 December, 1894 (No. 6117). A plant nearly allied to *Alomia*, but differing in the form and arrangement of its leaves, larger heads, and flattened achenes. From *Trichocoronis* it differs among other characters in its chaffy receptacle.

STEVIA ELATIOR HBK. var.? DECUMBENS. Stem strongly decumbent, leafy below, the erect portion nearly naked, 1 to 2 feet high: pubescence of the involucre very fine and appressed, not at all glandular: flowers 6½ to 7 lines long, purple; aristæ of the pappus long, commonly crooked or bayonet-shaped.—Collected by C. G. Pringle, on dry hills near Oaxaca, altitude 6,000 feet, 13 October, 1894 (No. 4974). Perhaps distinct from but very nearly related to this species.

EUPATORIUM PRINGLEI. Fruticose, 8 to 12 feet high: branches terete, light-brown, glabrous: leaves all opposite, petiolate, deltoid-ovate, acutish to sub-acuminate, crenate-serrate, truncate at base, puberulent and slightly scabrous above, paler and soon becoming quite smooth beneath, 15 to 18 lines long, 12 to 14 lines broad: petioles 4 to 6 lines long: branches of the inflorescence opposite, axillary, thyrsoid and together forming a panicle a foot or more in length: pedicels glandular-puberulent: bractlets setose: heads 5 lines long, about 33-flowered: involucral scales lanceolate-oblong, acute, dark-purple, ciliated, glandular-tomentulose and not striate, loosely imbricated, sub-biseriate and not very unequal, about 3 lines long: corollas white or roseate as well as the pappus also.—Collected by C. G. Pringle, on Sierra de San Felipe, Oaxaca, altitude 9,500 feet, 24 December, 1894 (No. 6118). Resembling *E. Rafaelense* Coulter, but differing in its deltoid leaves, truncate at base, and in its thicker densely glandular-pubescent and non-striated involucral bracts.

EUPATORIUM COLLODES. Fruticose: essentially glabrous and more or less glutinous, 2 to 3 feet high: branches striate-angulate: leaves opposite, ovate, closely sessile, acuminate, rounded at base, sharply and finely serrate or serrulate, often purplish-tinged, paler beneath, 3-nerved, commonly somewhat vernicose, 12 to 16 lines long, a little more than half as broad, of rather firm texture: corymbs many-headed; pedicels rather short: bractlets small with revolute tips: heads 20–25-flowered, purplish: scales of the involucres in 2 to 3 series, linear, attenuate, ciliate, purple-tipped: flowers considerably exserted, in dried state white or roseate: young achenes minutely ciliate on the angles.—Collected by C. G. Pringle, on hills, Las Sedas, Oaxaca, altitude 6,000 feet, 1 October, 1894 (No. 4941).

BRICKELLIA NUTANS. Tall, 5 to 8 feet high: stems terete, striate, purple, pubescent: leaves chiefly opposite (only the uppermost alternate), broadly ovate, acuminate, cordate, serrate,

green and puberulent above, paler and pubescent beneath, 2 to 2½ inches long, nearly as broad, 3-nerved at very base; lateral nerves soon branched: petioles 9 lines long, tomentulose: heads on short lateral leafy branchlets, slender-pedicelled, nodding or pendulous, 6 to 7 lines long, about 15-flowered: floral leaves ovate-lanceolate, acuminate or attenuate, serrate or subentire, subsessile: pedicels 4 to 6 lines long, tomentulose: involucral scales regularly imbricated in about 4 series, all obtuse, tomentulose and somewhat arachnoid-pubescent: achenes 2½ lines long, puberulent.—Collected by C. G. Pringle, on Sierra de San Felipe, Oaxaca, altitude 10,000 feet, 24 December, 1894 (No. 6114).

BRICKELLIA LANCIFOLIA. Tall, 5 to 8 feet high: branches slender, terete, striate, tawny, tomentulose and slightly scabrous: leaves all opposite, lanceolate, acuminate, narrowed at the base, obsoletely serrulate, scabrous above, paler reticulated and soft glandular-tomentulose beneath, 2 to 3 inches long, 10 to 12 lines broad; petioles 4 to 7 lines long, fuscous-tomentulose: flowering branchlets opposite, 3–6-headed, shorter than or considerably exceeding the leaves; pedicels slender, glandular-pubescent: heads nodding, 12-flowered, 6 to 9 lines long: involucral scales glabrous except at the obtuse mucronate tip, purplish, finely striate, lucid, imbricated in 4 or 5 very unequal series: achenes villous, at least when young.—Collected by C. G. Pringle, on Sierra de San Felipe, Oaxaca, altitude 8,000 feet, 3 January, 1895 (No. 6109).

GRINDELIA SQUARROSA Dunal, var. HIRTELLA. Branches and lower surfaces of the leaves covered with a fine slightly roughish pubescence; the type and other varieties being glabrous throughout and having the branches often lucid.—Collected by C. G. Pringle, on hills, Las Sedas, Oaxaca, altitude 6,000 feet, 16 August, 1894 (No. 4805).

ACHYROCLINE DEFLEXA. Stems erect, 3 to 4 feet high, strict, branching above, lanate: leaves oblong-lanceolate, acute at both ends, mucronate at apex, scarcely petioled at base, mostly deflexed or pendulous, sparingly arachnoid and green above, densely lanate and white beneath, 1½ to 3 inches long, 5 to 9 lines broad; margins somewhat revolute, irregularly subcrenulate: heads glomerate, about 5-flowered; glomerules corymbous; involucral scales about 9, oblong, obtusish to acutish, pale straw-color to silvery white: flowers all fertile, only one hermaphrodite: achenes ovate, glabrous.—Collected by C. G. Pringle, on Sierra de San Felipe, altitude 7,000 to 8,000 feet, November, 1894 (No. 6054). The other species of this genus hitherto attributed to Mexico have (acc. to descr.) much smaller, narrower leaves, and more deeply colored involucral scales, although the latter feature may very likely vary with age or change in drying.

SIEGESBECKIA REPENS. Perennial: stems several, decumbent and rooting at the base, sending out procumbent branches, ascending a foot or more in height, purplish, glandular-puberulent, about twice dichotomously forked; upper branches slender, erect: leaves

ovate-elliptic, obtuse or obtusish, serrulate, nearly or quite glabrous, green above, paler beneath, 9 to 18 lines long, half as broad; winged petioles nearly as long; uppermost leaves lanceolate, sessile, acutish: heads few, half inch in diameter, on slender densely glandular-puberulent peduncles; outer involucral bracts lanceolate to linear-oblong, obtuse, 4 lines long, a line wide, inconspicuously 3-nerved; inner bracts ovate, acutish: ray-flowers about 11, bearing sterile stamens; ligules nearly 3 lines long, obtusely 3-toothed at the apex and provided at the base on the inner side with 2 smaller teeth: achenes oblique, smooth.—Collected by C. G. Pringle, in cold brooks, meadows of Sierra de Clavellinas, altitude 9,000 feet, 16 October, 1894 (No. 4987).

GYMNOLOMIA TRIPARTITA. Stem slender, glabrous, nearly terete, pale brown, leafy, branched above: leaves partly opposite, others alternate, deeply 3-parted, dark green and scabrous above, much paler and grayish tomentulose beneath, 1 to 2 inches long, nearly as broad; segments oblong, obtuse, 2 to 3 lines broad, entire or with one or two irregular obtuse lateral teeth: petioles short, cuneate-winged: inflorescence corymbose; pedicels 8 lines to $1\frac{1}{2}$ inches in length: involucral scales lanceolate, acute, 3-nerved, glabrescent: ray flowers about 11, yellow, oblong, $3\frac{1}{2}$ lines long: disk conical, 4 lines in diameter: chaff strongly keeled, terminated by a short subulate tip.—Collected by L. C. Smith, at Cuicatlan, altitude 1,800 feet, 22 October, 1894 (No. 239).

PERYMENIUM JALISCENSE. Caudex short, thick, an inch in diameter, giving off numerous fibrous descending roots and several erect or decumbent slender scabrous furrowed stems about 2 feet high: leaves opposite, short-petioled, oblong to linear-lanceolate, obtuse, serrate or subentire, narrowed at the base, conduplicate, spreading and somewhat recurved, about 2 inches long, 3 to 6 lines wide, 3-nerved, scabrous; the lowest pairs considerably shorter and broader; petioles about a line long: heads about 3 together at the ends of the almost naked branches: peduncles very unequal: involucral scales in 3 series; the outer broadly ovate, obtuse, minutely cinereous-pubescent, ciliated upon the margin; the inner longer, about 2 lines in length: rays 8, unequal, about 3 lines long, more than two-thirds as broad, bright-yellow, minutely 3-toothed at the apex, ciliolate toward the base and upon the nerves on the outer surface: mature achenes about $1\frac{1}{2}$ lines long, minutely pubescent toward the apex.—Collected by Dr. Edward Palmer, Rio Blanco, Jalisco, August, 1886 (No. 310), and also by C. G. Pringle, on rocky hills near Guadalajara, 23 August, 1893 (No. 5426). Dr. Palmer's specimen has been referred to *P. Cervantesii* DC. by Dr. Watson, Proc. Am. Acad. xxii, 427, but it has been compared with the type at Geneva through the kindness of Dr. Casimir De Candolle and Monsieur Buser and proves to be quite distinct, nor does it appear to be a form of *P. Mendezii* DC., as suggested by Dr. Watson, which has an umbellate inflorescence. The plant is habitally marked by its strongly conduplicate and somewhat recurved leaves.

ENCELIA (§ GERÆA) HYPARGYREA. Shrub, 5 to 15 feet high: branches terete, striate, scabrous-pubescent: leaves opposite except the uppermost, ovate, acute or somewhat acuminate, cordate, obsoletely or more or less distinctly serrulate, thickish, densely gray-tomentose above, appressed sericeous-pubescent and silvery below, 3-nerved, 2 to 2½ inches long, three-fourths as broad; margins somewhat revolute; petioles about half inch long; floral leaves ovate-lanceolate, subsessile: heads corymbose, about 6 to 8 lines in diameter excluding the oblong yellow rays: the latter 10 to 12 in number: involucre campanulate; scales 2–3-seriate, oblong-linear, obtusish, roughish pubescent: chaff of the disk carinate, oblong, sub-3-dentate, puberulent: achenes 1½ lines long, densely sericeous-pubescent.—Collected by C. G. Pringle, in La Hoya Cañon, Oaxaca, altitude 3,000 feet, 2 November, 1894 (No. 6142).

ENCELIA (§ GERÆA) GLUTINOSA. A tall branching shrub, 10 to 15 feet high: branches covered with a roughish gray bark, somewhat white-woolly near the leaf-bearing summits: leaves alternate, approximate, short-petioled, ovate-lanceolate, acuminate, entire, nearly glabrous, but slightly papillose-scabrous, and almost lucid above, pubescent and not paler beneath, obtusish or scarcely acute at the base: 3 to 4 inches long, 15 to 16 lines broad; petioles densely pubescent, 3 lines in length: inflorescences terminal, corymbose, rather dense; heads nearly half inch in diameter (exclusive of rays), 7 lines in length, vernicose: involucre 2–3-seriate with the outer scales much shorter; scales thick, obtusish, somewhat striated: rays about 8, bright-yellow, fully half inch long: achenes linear-oblong, 4 lines in length, 2-awned, pubescent, and silky-ciliate.—Collected by C. G. Pringle, in La Hoya Cañon, Oaxaca, altitude 4,000 feet, 2 November, 1894 (No. 6024).

ENCELIA (§ GERÆA) RHOMBIFOLIA. Decumbent, densely pilose-pubescent with spreading white hairs, leafy to the middle: leaves (except the reduced uppermost) opposite, rhombic-ovate, acutish, harsh in texture, scabrous and tuberculate-hispidulous above, scarcely paler but more densely and softly pubescent and with frequent argenteous blotches beneath, serrate from below the middle, 3-nerved from above the base, 2 inches long, 12 to 15 lines broad, narrowed in the upper leaves to a sessile somewhat amplexicaul base, the lower short-petioled: inflorescence loose and irregular; heads half inch in diameter, short-peduncled, borne in irregular subracemose groups, 2 to 5 together at the ends of the almost naked branches: scales of the involucre 2–3-seriate, oblong-lanceolate, attenuate, grayish hirsute, the outer shorter: rays 8, yellow, 3½ lines long: achenes flattened, appressed-pubescent, ciliate on the edges; awns 2, with intermediate scales.—Collected by C. G. Pringle, on dry calcareous hills, Las Sedas, Oaxaca, altitude 6,000 feet, August, 1894 (No. 4813).

LEPTOSYNE PRINGLEI. Rootstock short-oblong, thickish and woody; stems several, decumbent, simple and leafy nearly to the middle, a foot or more high, striate-angulate, puberulent below:

leaves pinnate, about an inch long, ascending, puberulent; rhachis and pinnæ narrow, linear, acute and slightly pungent; leaflets usually 3 pairs and an odd one, 3 to 6 lines long; the lower pairs gradually more elongated: peduncles slender, erect, 4 to 6 inches long, 1-headed: head 8 or 9 lines in diameter, often bracteolate; outer involucral bracts herbaceous, about 5, oblong, obtuse, 1½ to 2 lines long; the inner bracts scarious, yellow, ovate-oblong, obtusish, about 3 lines long: rays about 6, yellow, oblong, 3-toothed, fertile, 5 lines long, half as broad; the middle tooth the smallest; achenes obovate, dark-colored, 2 lines long, two-thirds as broad, glabrous, rounded and emarginate at the apex: disk-flowers apparently all fertile, distinctly annulate.—Collected by C. G. Pringle, on the Sierra de San Felipe, altitude 7,000 feet, 7 August, 1894 (No. 4871). Habit of *L. Mexicana* Gray.

SCHKUHRIA PLATYPHYLLA. Erect, stoutish annual: stem terete, striate, pubescent, purplish, simple below: leaves all alternate, broadly ovate, obtuse, coarsely and somewhat doubly crenate-dentate but not at all dissected, abruptly contracted to a 3-nerved cuneate base, densely puberulent upon both surfaces, 2 to 2½ inches long, nearly or quite as broad, slightly paler beneath: petioles pubescent, 4 to 10 inches long: panicle much branched, densely glandular-pubescent: involucral bracts about 5, obovate, rounded at apex, herbaceous but with thin purple margins, glandular-pubescent externally, 2½ lines long: ray flowers none, disk flowers about 20 in a head: scales of the pappus about 8; achenes upwardly pubescent especially near the base, 2 lines long.—Collected by C. G. Pringle, on Monte Alban, Oaxaca, altitude 5,500 feet, 8 October, 1894 (No. 4975). Exceptional on account of its broad undivided leaves.

LIABUM KLATTII. Shrub, 15 to 20 feet high, leaves falling before the flowers appear, deltoid-ovate, obliquely acuminate, cuspidate-serrulate, abruptly contracted to a somewhat cuneate base, glabrous above, gray and densely arachnoid-pubescent beneath, about 5 inches long and nearly as broad, 3-nerved from a point somewhat above the base: flowering branches terete, at first arachnoid but quite glabrate, opposite, recurving, terminating in dense thyrsoid inflorescences: heads 8 lines long: involucral scales lance-linear, attenuate, imbricated in about two unequal series, densely dark glandular-pubescent: flowers bright yellow: pappus nearly white: corolla 5 lines in length.—Collected by C. G. Pringle, on Monte Alban, near Oaxaca, altitude 6,000 feet, 24 November, 1894 (No. 6059). For a critical comparison of this plant with certain neighboring forms we are indebted to Dr. F. W. Klatt, to whom we take pleasure in dedicating the species in recognition of his valuable contributions to the knowledge of American *Compositæ*.

SENECIO GRACILIPES. Herbaceous, perennial, erect, slender, 3 feet or more in height: stem simple up to the loosely paniculate inflorescence, striate, covered below with sparing arachnoid pubescence, above glabrate: leaves oblong in outline, deeply and regu-

larly pinnatifid, green and glabrous above, paler and arachnoid-pubescent beneath; lateral segments in about 8 pairs, divaricate, lanceolate, acuminate, repand-dentate, about 1½ inches long, a third as broad; the terminal one scarcely larger, narrowly deltoid; lower leaves on slender petioles (7 inches long); the upper upon winged petioles, auriculate-clasping at the base; bracts of the diffuse panicle narrowly lanceolate. attenuate, sessile, auriculate-clasping: heads discoid, usually solitary at the end of the slender branches; bractlets subulate-filiform: involucre about 13-phyllous, 4 lines long, pubescent, 20–24-flowered; the scales minutely dark-tipped and tufted at the apex: flowers ochroleucous: corolla segments short: achenes glabrous.—Collected by C. G. Pringle, on the Sierra de Clavellinas, altitude 9,000 feet, 24 October, 1894 (No. 6010).

SENECIO RETICULATUS DC. A plant of habit and foliage identical with an authenticated specimen of this species from De Candolle's herbarium, has been collected by Mr. Pringle on the Nevado de Toluca in the State of Mexico, 7 September, 1892 (No. 5262). The heads, however, have about twice as many flowers (8 rays and 26 disk flowers). The scales of the involucre are also more numerous, being about 16 in number.

CACALIA LONGIPETIOLATA. Slender, 3 feet or more in height, apparently strict: stem terete, purplish and glaucous: leaves palmately 5–7-lobed, 3 to 4 inches in diameter, cordate with narrow sinus, green, puberulent and reticulated above, grayish-tomentulose beneath; lobes lanceolate, stellately divergent, denticulate, acute and mucronate; sinuses rounded; petioles slender, smooth, about 4 inches in length: heads few, large, about 9 lines in length, terminal upon the long slender almost naked branches of an open panicle; involucre calyculate with short loose spreading linear or subulate bracts, the inner erect bracts about 9, oblong, dark-colored with scarious margins, narrowed to an obtusish apex: flowers about 50 in a head; tube slender, thickened at the base; throat ampliate, very short; lobes rather long but recurved or coiled in anthesis: achenes smooth.—Collected by C. G. Pringle, on dry ledges of the Sierra de San Felipe, Oaxaca, altitude 7,000 feet, 10 October, 1894 (No. 5828).

CACALIA MEGAPHYLLA. Tall, 6 to 10 feet high: stem terete, striate, ferrugineous-tomentulose: radical leaves large, centrally peltate, about 10-lobed, orbicular in outline, 1 to 2 feet in diameter, finely pubescent above, slightly paler and grayish-tomentose beneath; lobes ovate-lanceolate, sharply and unequally sinuate-dentate, usually 2–3-lobed toward the apex; secondary lobes only slightly divergent not divaricate with reference to the primary lobes, acute: panicle ample, pyramidal, bracts reduced, subulate; heads numerous, 5-flowered, 5 to 7 lines long, shortly and inconspicuously calyculate at the base or ecalyculate: involucral scales 5, ovate-oblong narrowed to an obtusish apex, densely tomentose, 4 to 5 lines long, nearly or quite 2 lines broad: akenes glabrous, stout, many-striate, light-colored.—Collected by C. G. Pringle, on

hillsides near Guadalajara, 10 October, 1889 (No. 2490). Distributed as *Cacalia peltata* H.B.K., which however differs in its more numerously flowered heads, more leafy inflorescence, in the presence of long linear calyculate bracts, commonly exceeding those of the involucre, also in the more divaricately cleft lobes of the leaves.

CACALIA OBTUSILOBA. Radical leaves subcentrally peltate, orbicular in outline, 6-lobed to the middle, green and glabrate above, somewhat paler and puberulent beneath, a foot in diameter; lobes broad, again irregularly and obtusely lobed and mucronate-denticulate; cauline leaves not seen: stem subsulcate, sordid-tomentulose: inflorescence thyrsoid-paniculate, tomentulose: heads many, 5-flowered, calyculate at base: involucral scales 5, oblong-linear, obtusish, green-backed, and tomentulose, 2½ to 3 lines long: flowers light colored.—Collected by C. G. Pringle, on the Sierra de San Felipe, altitude 6,000 feet, 17 November, 1894 (No. 5840).

CACALIA PAUCICAPITATA. Simple, slender, erect, 3 to 4 feet high: base tuberous, sending off a few stout fibres: stem terete, and as well as the petioles, pedicels, and under surface of the leaves densely white arachnoid-lanate; the indumentum being more or less deciduous: radical leaves sinuate-pinnatifid, 4 to 6 inches long, two-thirds as broad, green and glabrate above, lateral lobes in 3 to 5 divaricate pairs, oblong, acutish, subentire or again more or less divaricately lobed; petioles about equalling the blades; cauline leaves only one or two similar near the base: inflorescence a simple raceme: heads 6 to 8, large, 40–50-flowered, 9 or 10 lines broad, calyculate with loose linear scales: inner involucral bracts about 13, broadly oblong, narrowed to an obtusish ciliolate apex: corolla tube slender, 4 lines long, thickened at the base, throat short; segments narrow: achenes elliptic, densely silky-villous.—Collected by C. G. Pringle, on dry slopes under oaks, Sierra de Clavellinas, altitude 7,000 feet, 25 October, 1894 (No. 6018).

CACALIA SILPHIIFOLIA. Radical leaves ovate-oblong, very deeply cordate, obtuse, shallowly and somewhat doubly sinuate-dentate, nearly a foot in length, 5 inches in breadth, glabrous, pinnately veined, scarcely paler beneath; midrib purplish; petioles wingless, purplish, striate, nearly a foot and a half in length, woolly at the base; lower cauline leaves unknown, the upper reduced to very narrow linear dried bracts, 6 lines to an inch in length: stem green, striate, puberulent; floral leaves filiform: heads very numerous in a much-branched compound corymb, about 8 flowered: scales of the involucre 6 to 8, oblong, acute, strongly carinate, 2½ lines long: corollas 5 lines long, segments two-thirds as long as the tube: achenes ribbed, nearly 2 lines in length.—Collected by C. G. Pringle, on the Sierra de las Crucis, State of Mexico, 21 August, 1892 (No. 5251). Radical leaves resembling in outline those of *Silphium terebinthinaceum* L. They are thinner and less strongly reticulated than in the

related species, *C. pachyphylla* Sch. Bip. and *C. Palmeri* Greene, besides being of very different shape.

CACALIA TRIDACTYLITIS. Tall, 8 feet high: stem leafy, sulcate-angulate, purplish, tomentulose: leaves trifid at least to the middle, green and puberulent above, paler and grayish-tomentose beneath, 3 to 6 inches long, nearly as broad, pinnate-palmately 5-7-nerved from somewhat above the cuneate base; lobes lanceolate, acute, somewhat incised-dentate: inflorescence a broad corymbous panicle leafy at base: heads very numerous, 5 lines in length, about 10-flowered, calyculate: involucral scales about 7, oblong-linear, acute, somewhat keeled, scarious margined, glabrate: flowers white, considerably exceeding the involucres: achene ribbed, glabrous.—Collected by C. G. Pringle, on the Sierra de San Felipe, Oaxaca, altitude 6,000 feet, 19 November, 1894 (No. 5841).

CNICUS IMBRICATUS. Slender, 3 to 5 feet high: radical leaves narrow and elongated 10 to 18 inches long, an inch wide, divided to the rhachis; the broadly ovate, angulate spinose-dentate lobes very numerous, about 80, mostly attenuate and regularly imbricated, green and puberulent, glabrate above, grayish-arachnoid beneath; cauline leaves narrowly oblong, pinnatifid, decurrent at the base, 2 to 3 inches long; lobes short, spinose-dentate: heads terminal and solitary on long slender branches, nodding, depressed-globose, 1¼ inches in diameter: involucral scales linear-lanceolate, spinose-tipped, the outer spinose-ciliate, the inner elongated, densely purplish-lanate.—Collected by C. G. Pringle, in wet meadows, Sierra de Clavellinas, altitude 9,000 feet, October, 1894 (No. 6006). A very attractive species.

UROSTEPHANUS n. gen. of *Asclepiadaceæ* (*Gonolobeæ*). Calyx 5-parted, glanduliferous at the sinuses within. Corolla rotate, 5-parted; tube short; lobes flat, ovate or oblong, with dextrorsely imbricated margins. Corona borne upon the lower part of the column, tubular, nearly equalling the gynostegium, shallowly parted at the summit into 5 internal hornlike processes opposite the stamens and five external lobes alternating with them and produced on their outer surface and just beneath the apex into two filiform flexuous tails. Stamens united with the base of the corolla; filaments connate into a very short tube; anther-cells oblique; pollinia solitary in the cells, almost pendulous. Stigma depressed. Fruit and seeds unknown.—Twining. Leaves opposite, ovate, cordate. Flowers umbellate-cymose.

U. GONOLOBOIDES. Hirsute with somewhat tawny hairs subappressed on the leaves and reflexed on the slender stem: leaves ovate, entire, acuminate, cordate with a narrow sinus and rounded lobes, scarcely paler beneath, 2 to 2½ inches long, half as broad; petioles half to three-fourths inch in length: peduncles 2 lines long, 1–5-flowered; pedicels of equal length: lobes of the calyx ovate-lanceolate, acute, nearly 2 lines long; pilose externally, glabrous within: corolla in dried state olive green, pilose externally and covered at the throat within, with a short dense wool;

lobes ovate-oblong, obtusish, 4 to 5 lines long, 2½ lines broad at base: corona black.—Collected by C. G. Pringle, on hills above Oaxaca, altitude 6,000 feet, 6 August, 1894 (No. 4753).

BUDDLEIA FLOCCOSA Kunth. Two forms of this species are shown by Mr. Pringle's 6025 (=6139) and by his 4925 from Oaxaca. The former numbers represent the typical form with rounded, deflexed interpetiolar appendages, while in the latter number these stipular structures are obsolete. No other differences have been noted. The unappendaged form has also been secured in Guatemala by Donnell-Smith and von Tuerckheim.

IPOMŒA BRACTEATA Cav. var. PUBESCENS. A woody vine loosely twining to 15 feet: branches and petioles pubescent: leaves irregularly few-toothed, appressed sericeous-pubescent upon both surfaces.—Collected by C. G. Pringle, on barrancas near Guadalajara, altitude 4,500 feet, 3 May and 9 July, 1894 (No. 4734).

IPOMŒA SUFFULTA Don. (*Convolvulus suffulta* HBK. Nov. Gen. et Spec. iii, 102, t. 211). So far as we can learn this species has never been collected since it was first found upon the volcano Jorullo by Humboldt and Bonpland. It has now been rediscovered in Oaxaca, having been secured by C. G. Pringle (No. 4755); on Monte Alban, altitude 5,800 feet by L. C. Smith (No. 141); and Valley of Oaxaca, altitude 6,500 to 7,800 feet, by E. W. Nelson (No. 1541). The root, apparently not seen by Kunth, is thick and woody: the stems many, slender, prostrate-ascending.

JACQUEMONTIA SMITHII. Suffruticose at base: much branched: stems procumbent: branches puberulent, ascending, 2 to 3 feet high, not twining: leaves ovate, acutish, mucronate, cordate, entire, puberulent upon both sides, the larger 1½ to 2 inches long, two-thirds as broad; petioles 1 to 9 lines long: peduncles slender, 1 to 2½ inches long, loosely 2–5-flowered: pedicels 3 to 4 lines long: outer sepals rhombic-ovate, acuminate, about 3 lines long; the inner narrowly ovate, acuminate: corolla 6 lines long: lobes of the stigma thick, subglobose.—Collected by L. C. Smith, at Cuicatlan, Oaxaca, altitude 1,800 feet, 22 October, 1894 (No. 246); by C. G. Pringle, on dry calcareous soil, San Antonio, altitude 2,500 feet, 1 September, 1894 (No. 4848); and by E. W. Nelson, six miles above Dominguillo, Oaxaca, altitude 6,500 feet, 22 October, 1894 (No. 1600). Foliage and flowers much as in *L. violacea* Choisy, but stem not twining, inflorescence looser, and lobes of stigma strikingly different, being in the latter species slender and almost linear.

SOLANUM PRINGLEI. Herbaceous, unarmed, with a soft gray pubescence; hairs simple, those of the stem and petioles spreading, of the leaves appressed: leaves single below, geminate above, ovate, acuminate, abruptly contracted to an acute base, 2 to 5 inches long, two-thirds as broad; petioles 4 to 12 lines long: flowers an inch in diameter, blue, axillary in pairs; pedicels an inch or more in length: calyx urceolate with 5 or 10 small obtuse dark-colored prominences below the thin shallowly and bluntly

3–4-lobed rim: corolla rotate, pentagonal, nearly entire: stamens erect, unequal, one longer: fruit globose, bright red, nearly half inch broad.—Collected by C. G. Pringle, in mountain cañons near Guadalajara, 18 November, 1892 (No. 5343).

CHAMÆSARACHA POTOSINA. Densely glandular-pubescent, freely branched: stems and branches subterete, finely striate: leaves geminate, ovate-lanceolate, acute, contracted below to a shortly cuneate base, thin in texture, the larger ones 18 to 22 lines long, half as broad: pedicels solitary or less frequently in pairs, 4 lines long in anthesis: calyx 5-toothed almost to the middle, nearly enveloping and closely appressed to the fruit, but finally ruptured and more or less reflexed, teeth ovate, acute, ciliated: corolla rotate, 5-toothed, nearly to the middle, 4 lines broad, pale yellow, pubescent in the throat; segments ovate, acute, pubescent upon the outer surface near the tip and ciliate: filaments nearly twice as long as the oblong anthers: fruit globose, red, the size of a pea.—Collected by C. G. Pringle, in Tamasopo Cañon, San Luis Potosi, 25 November, 1890 (No. 3654). Leaves quite entire, thinner than in the other Mexican species, and corollas smaller and more deeply divided.

SARACHA GRANDIFLORA. Densely cinereous-pubescent: stems angulate, tomentose: leaves single or geminate, ovate, undulate or somewhat sinuate-dentate, obtusish, appressed-villous upon both surfaces, pale beneath, 2½ inches long, 2 inches broad, abruptly contracted at the base but decurrent into tomentose petioles 6 to 7 lines in length: peduncles axillary, 3 to 7 lines long, about 3-flowered; pedicels 7 to 9 lines in length: calyx appressed-villous, about 10 lines broad in anthesis, 1¼ inches in fruit, with 5 shallow triangular blunt lobes: corolla pentagonal, scarcely lobed, pubescent on the outer surface, conspicuously ciliated, 14 lines in diameter: stamens rather close in the throat; filaments nearly or quite glabrous but a line or two long: fruit globular, 5 lines in diameter.—Collected by C. G. Pringle, on hills near Patzcuaro, Michoacan, 22 July, 1892 (No. 5273).

JUSTICIA LINEARIS. Tomentulose, fruticose: leaves linear, crowded near the ends of the ascending cinereous branches, erect, an inch in length, a line in breadth, 1-nerved, sessile; margins strongly revolute: flowers sessile, axillary: calyx deeply 5-parted; segments sub-equal, linear, attenuate, 4 lines long: corolla pubescent upon the outer surface especially upon the veins, about 9 lines in length with an ampliate throat, the upper lip very shortly bifid; the lower more deeply 3-parted, the segments rounded, the middle one the largest: stamens of the genus: styles slightly pubescent below, minutely and unequally bidentate at the apex; valves of the capsule half inch long.—Collected by C. G. Pringle, upon dry hills, Las Tablas, San Luis Potosi, 5 August, 1891 (No. 5038). This species showing all the floral characters of *Justicia*, is very distinct in habit from any species known to us. It was collected in a season of especial drought and only a very limited quantity of material secured.

LIPPIA NUTANS. Shrub with grayish glabrate stems and pale brown angulate sparingly puberulent branchlets: leaves ovate-acutish, cuneate at the base, thickish, strongly rugose-warty, hispidulous and slightly lucid above, paler and rather densely pubescent beneath, an inch long, two-thirds as broad; petioles about 2 lines long, canaliculate and hispid pubescent above: peduncles slender, commonly recurved and nodding, opposite in the upper axils, pubescent, about 9 lines long: heads globose, an inch in diameter: bracts ovate, obtuse, reticulated, glandular-pubescent upon both surfaces and ciliate, thin, pale, and subchartaceous, the lowest ovate; the upper more elliptic, 4 to 6 lines long, half as broad: flowers shortly pedicellate, $3\frac{1}{2}$ lines long: calyx densely pubescent.—Collected by C. G. Pringle, in Las Hoyas Cañon, Oaxaca, altitude 4,500 feet, 2 November, 1894 (No. 5650).

LIPPIA OAXACANA. Shrub, 3 to 5 feet high: stems cinereous, smoothish, subterete; branchlets canescent-tomentose: leaves ovate-oblong, obtuse or rounded at the base, acute or obtuse at the apex, 10 to 18 lines long, half as broad, very rugose and densely pubescent above, paler and tomentose beneath, crenulate-serrulate, short petiolate: inflorescences terminal on the branches, rather dense and spike-like, 2 inches long, nearly an inch in diameter, somewhat looser and rarely branched below: bracts rhombic-obovate, yellowish green, 4 lines long, half as broad, abruptly acuminate, pubescent upon the outer surface, ciliate upon the margin, 1-flowered; flowers $2\frac{1}{4}$ lines long: calyx 2-lobed, densely pilose-pubescent: corolla 4-lobed, $1\frac{1}{2}$ lines long, sparingly pubescent externally: fruit pear-shaped.—Collected by C. G. Pringle, on dry limestone hills, Las Hoyas Cañon, Oaxaca, altitude 5,000 feet, 1 November, 1894 (No. 6021); and by E. W. Nelson, six miles above Dominguillo, altitude 5,000 to 6,000 feet, 3 October, 1894 (Nos. 1586 and 1841).

STACHYTARPHETA NELSONII. Fruticose: branches cinereous: branchlets more or less distinctly 4-angled, sordid-tomentulose: leaves opposite, or nearly so, rhombic-ovate, serrate-dentate from below the middle, acutish, rather abruptly contracted at the base and then decurrent upon the petiole, appressed-pubescent above, paler and tomentulose beneath, 1 to $1\frac{1}{2}$ inches in length, 6 to 8 lines in breadth: spikes 2 to 4 inches long, 4 lines in diameter: bracts lance-linear, acute, pubescent upon both surfaces, not strongly ciliated, 3 lines long, a line broad below: calyx split two-thirds of the way to the base on the ventral side, 4 lines long; externally pubescent, teeth cohering: corolla curved and nodding, 7 lines long, externally glabrous, pubescent in the throat, purple.—Collected by E. W. Nelson, six miles above Dominguillo, Oaxaca, altitude 5,000 to 6,500 feet, 30 October, 1894 (No. 1590). Habit nearly as in *S. acuminata*, DC., which was also collected by Messrs. Pringle and Nelson. The latter species is much less pubescent and has longer and conspicuously ciliate bracts.

SALVIA LITTÆ Vis. Specimens have just been received which agree in all essential characters with Bentham's description of the above species in DC. Prodr., but the plant differs, however, in being herbaceous, as noted by the collector, and also in having a sparingly pubescent style. Without access to the type it is impossible to say, with absolute certainty, whether or not this plant is the same.—Collected by C. G. Pringle, on Sierra de Clavellinas, Oaxaca, altitude 9,000 feet, 18 October, 1894 (No. 4991); also by E. W. Nelson 18 miles southwest of the City of Oaxaca, altitude 7,500 to 9,500 feet, 10–20 September, 1894 (No. 1342).

SALVIA VITIFOLIA Benth. Excellent specimens, agreeing in all points with the original description, show the root-character not hitherto described. From a knotted root-stock, fleshy fusiform fibres are given off which in the material at hand are a third of an inch in diameter.—Collected by C. G. Pringle, on the Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 26 May, 1894 (No. 4659); also by E. W. Nelson, in the same locality, 1 September, 1894 (No. 1169); and by L. C. Smith, San Juan del Estado, altitude 7,000 feet, 4 June, 1894 (No. 169). Here also should be placed Mr. Seaton's No. 376 from Maltrata.

SALVIA THYRSIFLORA Benth. A shrubby plant with a beautifully thyrsoid inflorescence has been collected by Mr. Pringle on mountains near Patzcuaro, 21 December, 1891 (No. 4097), which corresponds in all particulars to Bentham's description of this species except in having somewhat larger acute leaves (2 inches long) and a calyx puberulent but not glandular-pubescent.

SCUTELLARIA AUREA. Stem branched, densely grayish pubescent: leaves broadly ovate, shortly and acutely acuminate, coarsely crenate-dentate, thin, green and puberulent, much paler and pubescent especially upon the veins beneath, rounded or subcordate at the base, 3 to 4 inches long, 2 to $2\frac{3}{4}$ inches broad; petioles 8 to 15 lines long, densely pubescent: flowers in pairs subtended by small ovate acuminate bracts and forming several elongated simple racemes; pedicels a line long: calyx green, puberulent, ciliate upon the margin, in anthesis 2 to $2\frac{1}{2}$ lines long: corolla an inch in length, puberulent, orange-colored, paler ventrally; the slender proper tube densely and retrorsely pubescent within, throat more or less ventricose; lateral lobes united with the dorsal pair to form the upper lip; the lower lip of a single emarginate lobe.—Collected by L. C. Smith, Rancho de Calderon, Oaxaca, altitude 6,500 feet, 13 August, 1894 (No. 173).

LORANTHUS INORNUS. Stems slender, terete or nearly so, glabrous, scoparious, flexuous, branched: branches spreading, not enlarged at the nodes, essentially terete: leaves alternate, mostly reduced and subulate, the larger 8 lines long, $1\frac{1}{2}$ lines broad, oblanceolate, acutish, cuneate at base, nerveless: flowers axillary, sessile, usually in pairs or solitary, $1\frac{1}{2}$ lines long: calyx cupulate, entire: divisions of the corolla 4, oblong, acutish, caducous and early disclosing the persistent style: fruit ovoid, $1\frac{1}{2}$ lines long,

two-thirds as broad.—Collected by L. C. Smith, at Cuicatlan, altitude 2,000 feet, 27 August, 1894 (No. 122). The *Loranthus*, which in character most nearly approaches this is *L. inconspicuus* Benth., which is said to have ancipital branchlets and obovate oblong obtuse obscurely 3-nerved leaves.

PEDILANTHUS TOMENTELLUS. Tall, 5 to 8 feet in height, rusty tomentulose: branches stout, terete: leaves short-petioled, ovate-oblong to oblong-lanceolate, narrowed at both ends, obtusish, tomentulose upon both surfaces, 2 inches long, an inch broad: cymes terminal, twice dichotomously forked, about 2 inches in diameter, outer floral leaves and those at the forks large, bright red, sessile, broadly ovate or suborbicular, cordate, shortly acuminate, tomentulose, 12 to 15 lines long, inclosing the smaller inner bracts and involucres, thus giving the cyme a somewhat 2-headed appearance: involucres half inch in length, tomentulose, unequally 5-cleft at the mouth, the divisions rounded to subtruncate with an erose or fimbriated margin, the 3 posterior much smaller, linear-oblong; the appendage deeply 2-cleft; divisions about 3½ lines long, lanceolate-obtuse, thickened at the apex: glands 2 or 4: pedicels of the ♂ flowers glabrous; filaments and anthers pubescent; pedicel, ovary, and style of the ♀ flower ferrugineous-tomentose; style 2½ lines long, the 3 divisions 2-cleft.—Collected by C. G. Pringle, in fence-rows, near the City of Oaxaca, August, 1894 (No. 4912); and by E. W. Nelson, 40 miles northeast of the City of Oaxaca, altitude 5,500 feet (No. 1201).

EUPHORBIA MACROPODOIDES. Low, somewhat succulent, 2 to 5 inches high, springing from a dark rough tuber: the latter at first fusiform but becoming much thickened and irregular, 1½ inches in diameter, sending off occasional fibres: stem smooth, weak, hollow, pale and leafless below as though subterranean; copiously dichotomously or alternately branched; branches crowded, leafy: leaves chiefly alternate (a few sub-opposite), slender-petioled; suborbicular to short-oblong, regularly but obscurely serrulate, rounded both at the apex and at the nearly equal base, 2 to 3 lines in diameter, sparingly pubescent or almost glabrous, slightly paler beneath; petioles 1 to 1¾ lines long: involucres solitary, axillary, sparingly pubescent, a little over 1 line in diameter, on slender peduncles (3 to 4 lines long); glands 5, reniform with ovate obtuse appendages; lobes of involucre slightly fimbriate: capsule strongly 3-angled, glabrous; styles bifid, spreading; seeds ovoid, grayish, a line long.—Collected by C. G. Pringle, on the Sierra de San Felipe, Oaxaca, altitude 10,000 feet, 26 June, 1894 (No. 4713). Habitally and in floral characters very near *E. macrocarpus* Boiss., but with leaves rounder, longer-petioled, smoother and serrulate.

ACALYPHA GLANDULIFERA. A monœcious shrub, 5 to 8 feet high: branches terete, brownish, finely pubescent: leaves ovate, cordate, tipped with a short caudate point, serrate-dentate, appressed-pubescent above, more densely pubescent or grayish-tomentose beneath, 2 to 3 inches long, two-thirds as broad;

petioles 8 to 16 lines long, densely pubescent; stipules subulate, reflexed, pubescent upon the lower surface, about 2 lines long, at length deciduous: staminate inflorescence elongated flexuous, about 4 inches long, upon peduncles 1 to 4 lines in length: pistillate spike oblong, rather loose-flowered, 1¼ to 1½ inches long, about two-thirds as broad, peduncles slender, rather rigid, ascending, an inch and a half long, cinereous-pubescent below, glandular-pubescent above; bracts 1-flowered, 7-parted; each segment lanceolate and green at the base, elongated to slender purple filiform tips, 4 to 6 lines in length, bearing numerous divaricate glanduliferous hairs: ovary hispid-pubescent toward the apex; styles multifid, reddish-purple.—Collected by C. G. Pringle, wet cañons, Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 13 August, 1894 (No. 4789); and by E. W. Nelson, in the vicinity of Sierra de San Felipe, altitude 9,500 to 11,000 feet, 1 September, 1894 (No. 1165).

PARIETARIA MACROPHYLLA. Suffrutescent and decumbent at base, 1 to 2 feet high, finely pubescent: stem subterete, striate: leaves thin, lanceolate, narrowed both ways, mostly caudate-attenuate to an obtusish falcate secund tip, punctate, nearly glabrous, dark green above, scarcely paler beneath, of variable size, the larger 5 inches long, 1¼ to 1½ inches broad, mostly 3-nerved from the base, on thickish petioles 2 to 2½ inches in length: inflorescence at first glomerate, becoming looser; the axillary cymes 6 to 8 lines long, spreading, very pubescent: lobes of the calyx 4, lanceolate, acuminate, about a line long, twice the length of the tube, nearly glabrous: fruit becoming black and shining, nearly half line in length.—Collected by E. W. Nelson, on the top of the Sierra Madre near Chilpancingo, Guerrero, altitude 9,000 to 10,200 feet, 24 December, 1894 (No. 2231).

SPIRANTHES ERIOPHORA. Roots several, oblong, fleshy, tuber-like: base of stem surrounded by the sheaths of old leaves: leaves radical, narrowly oblong-lanceolate, acute, 3 to 4 inches long, 3 to 4 lines wide, glabrous: stem a foot to a foot and a half high, glabrous below, densely ferrugineous-lanate above, covered throughout its whole length by white and scarious ovate-lanceolate attenuate striate bracts: spike 4 to 6 inches long, 5–10-flowered; floral bracts similar in texture to those of the stem, more ovate, exceeding the flowers: flowers sessile: the erect ovary as well as the external surface of the outer divisions of the strongly deflexed perianth pubescent: the upper sepals oblong-lanceolate, acute: the lateral linear-lanceolate, acuminate, about 7 lines long: lateral petals adnate to the upper sepal; labellum panduriform; margins involute; lateral lobes very short, almost obsolete.—Collected by C. G. Pringle, in pine woods, Sierra de San Felipe, Oaxaca, altitude 9,000 feet, 31 May, 1894 (No. 4682).

SPIRANTHES RUBROCALOSA. Tuberous roots 2 to 4, oblong, covered with minute fibres: radical leaves 2, narrowly lanceolate,

acuminate both ways, glabrous, 3-nerved, including the petiole 4 to 5 inches long, half inch broad: stems a foot or more in height, smooth or somewhat pubescent: scales oblong-lanceolate, sharply acuminate: floral bracts ovate to elliptic-lanceolate, acuminate, 4 to 6 lines long, about equalling the ovary: spike many-flowered, 4 to 7 inches long; lower flowers sometimes scattered; the upper imbricated; perianth nodding; sepals narrowly oblong, obtuse, 3-nerved, 2 lines long, not noticeably decurrent upon the ovary; lateral petals spatulate, obtuse, 1-nerved, equalling the sepals; labellum shortly unguiculate, oblong, obtuse, 2 lines long; the blade shortly and inconspicuously auricled at the base; margin slightly wavy, inflexed near the apex; callosities 2, two-thirds the length of the labellum, bright red: fruit 5 lines long.—Collected by C. G. Pringle, chiefly under *Arbutus*, in cool porphyritic gravel, Sierra Madre, Chihuahua, October, 1887 (No. 1373); and on dry ledges under firs, Sierra de las Crucis, 20 August, 1892 (No. 5326). Mr. Pringle's two plants differ only in the fact that in the first mentioned the stem and inflorescence is sparingly pubescent, in the other quite glabrous.

SISYRINCHIUM ALATUM Hook. var.? ANGUSTISSIMUM. Erect 1½ feet high: root a cluster of elongated tough fibres somewhat thickened below: stems scarcely at all flexuous, only 1 to 1½ lines in breadth: cauline leaves 4 to 12 inches long, 1½ to 2 lines broad, erect: flowers and fruit as in the typical form but spathes more slender.—Collected by C. G. Pringle, on the Sierra de San Felipe, altitude 9,500 feet, 22 June and 29 August, 1894 (No. 4703). The tall slender erect stems and narrow elongated leaves are so different from the original form of the species that the present plant would have appeared distinct but for the occurrence of a good intermediate in Mr. J. Donnell-Smith's No. 1297 from Guatemala, and the well known polymorphous character of the species.

SISYRINCHIUM EXALATUM. Erect, 1½ to 2 feet or more in height: root a cluster of long stout but scarcely tuberous fibres; stem terete, smooth, 3–5-leaved, ending in several dichotomous flexuous branches, subtended by linear-lanceolate bracts: leaves linear attenuate; the outermost basal 2 to 4 inches long, 2 lines broad, flat; the inner basal and lower cauline elongated, 8 to 18 inches long, 2 to 3 lines broad; the upper shorter, bractlike: clusters of flowers solitary, terminal on the branches, 3–5-flowered; outer spathes 14 to 22 lines long, exceeding the inner: perianth golden yellow; the outer divisions obovate, short-acuminate, about 4 lines long, 2 lines broad; the inner slightly smaller: filaments united for about a third of their length; anthers oblong-linear, about 3 lines in length: young capsule pubescent, short-obovoid, 3 lines long.—Collected by L. C. Smith on the Cuilapan Mountains, Oaxaca, altitude 7,000 feet, 27 June, 1894 (No. 52).

SISYRINCHIUM POLYCLADUM. Tall, much branched and very leafy above, 1½ feet high, drying green: root fibres numerous, 2 to 4 inches long, fusiform-thickened near the ends: stems erect,

rather slender, nearly terete and leafless up to the first fork: branches flattened and narrowly winged, scarcely a line in breadth, flexuous, several times forked: radical leaves 6 to 8 inches long, a line wide, surrounded at the base by fibres of decayed leaves; cauline leaves $2\frac{1}{2}$ to 4 inches long, $1\frac{1}{2}$ to 3 lines broad, often falcate: spathes solitary, terminal upon the ultimate divisions of the branches, 2(–3)-flowered, 8 to 10 lines long, slender and not ventricose: flowers 8 lines in diameter, yellow, exserted upon slender pedicels: divisions of perianth elliptic: stamens connate only at the base: capsule shortly obovate-oblong, somewhat triquetrous, puberulent when young but quite glabrate, at maturity nearly 4 lines in length.—Collected by C. G. Pringle, on rocky banks, Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 11 September, 1894 (No. 4902).

NEMASTYLIS DUGESII Watson, Proc. Am. Acad. xxiv, 86. Add syn. *N. flava* Robinson, ibid. xxix, 323. Dr. Watson's species, described from drawings and somewhat fragmentary material, was not at once recognized upon its subsequent collection in more perfect specimens.

HECHTIA PRINGLEI. Leaves fifteen or twenty, clustered at the base, linear-oblong from an ovate base, spinose-tipped and pungent, about 8 inches long, remotely serrate with firm curved reddish spines; margins repand and in dried state involute; both surfaces but especially the upper argenteous, scurfy: stem 2 to 4 feet high, half inch thick, simple, scape-like: panicle a foot in length, cylindric, mealy-puberulent: bracts attenuate from an ovate base: rhachis flexuous, branches numerous, mostly simple, spike-like, ascending or somewhat flexuous and more or less spreading: bractlets ovate, acute, erose, each subtending a single flower: the ♂ flowers subsessile, outer divisions of the perianth ovate-rotund, 3-nerved, scarious-margined, somewhat puberulent on the outer surface, a line long, the inner a third longer, elliptic-oblong, obtuse: anthers slightly exserted, apiculate: ♀ flowers sessile; outer divisions of perianth deltoid, acuminate; the inner longer, lanceolate, attenuate.—Collected by C. G. Pringle, on the east side of the valley of Oaxaca, abundant, sometimes growing in patches or masses, May, 1894 (No. 4637).

DIOSCOREA CAPILLARIS Hemsl. Specimens corresponding in all essential points to Hemsley's description of this species, have been collected by Mr. Pringle, at El Parian, Oaxaca; altitude 5,000 feet, 3 October, 1894 (No. 5700), and on dry ground in the Sierra de San Felipe, altitude 7,000 feet, 11 October, 1894 (No. 5829). In the latter locality the hitherto undescribed fruit was secured, furnishing the following supplementary characters: fertile spikes simple, 1 to 4 inches long; capsules deflexed, elliptical, 6 to 7 lines in length, half as broad, tipped with the persistent styles and stigmas.

DIOSCOREA CONVOLVULACEA Cham. and Schlecht. Specimens agreeing well in other respects with this species but having very large flowers (5 lines in diameter) were secured by Mr. Pringle

on the Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 13 August, 1894 (No. 5672). The segments of the perianth are deep purple, almost black, but sometimes tipped with yellow.

ANTHERICUM LEUCOCOMUM. Root-fibers numerous, long, simple, enlarged and fusiform near their ends: base of the stem surrounded by persistent fibrous remains of earlier leaves: radical leaves 8 to 12, lance-linear, 3 to 4 inches long, 3 to 4 lines broad, acute, entire, narrowed at the base, conspicuously and densely white-pilose upon both surfaces, 13–15-veined; margins ciliated: stem somewhat compressed, pilose at least toward the base, leafless, 6 inches to a foot high: bracts scarious, attenuate, the lower 6 to 8 lines long: inflorescence a simple or branched raceme, 1½ to 8 inches long: pedicels 2 to 4 lines long, articulated in the middle: flowers usually 3 in each bract; perianth yellow; divisions oblong-lanceolate, acute, 3-nerved, 6 lines long: filaments smooth: capsule short-oblong, 3½ lines in length, glabrous. —Collected by C. G. Pringle, in Oaxaca, 1894 (No. 4783), and by L. C. Smith, at Cuilapan, Oaxaca, altitude, 6,000 feet, 27 June, 1894 (No. 63).

SCHŒNOCAULON TENUIFOLIUM. *Veratrum tenuifolium* Mart. and Gal., Bull. Acad. Brux. ix, 380 (reprint, p. 9). *Asagræa? tenuifolia* Kunth, Enum. iv, 700. This species, now rediscovered by Mr. Pringle, proves quite distinct from *S. officinale* Gray, with which it has been united by recent authors. The original description may be supplemented as follows: Caudex erect, cylindrical, 4 to 10 inches long, surrounded by a dense envelope of dark fibers: leaves linear, attenuate, 2 feet or more in length, 3 lines in breadth, smooth upon the surfaces, obscurely or obsoletely denticulate, about 11-nerved: naked scape 6 to 8 inches high, terete, smooth: inflorescence dense, 3 to 4 inches long: bractlets broadly ovate, obtuse, scarious, shorter than the sessile flowers: divisions of the perianth obovate or sub-rotund, 7–9-nerved, green tipped with red, 2¼ lines long; margins erose: fruiting spike very broad, 2 inches in diameter, fertile only near the base: valves 6 to 8 lines long.—Collected by C. G. Pringle, on summit ridges, Sierra de San Felipe, Oaxaca, altitude 10,200 feet, 22 May (in flower) and 21 August (in fruit), 1894 (No. 5857).

III. *A Synoptic Revision of the Genus Lamourouxia.*

LAMOUROUXIA HBK. (Dedicated to *J. V. F. C. Lamouroux*, professor of natural history at Caen, born 1773, died 1825.)—Calyx campanulate, 4-cleft; segments subequal or connate in pairs (in one species the ventral cleft much deeper than the others, giving the calyx a unilateral and spathe-like form). Corolla long, much exceeding the calyx; throat elongated and more or less ventricose, laterally compressed; limb bilabiate; posterior lip erect, somewhat galeate, entire or emarginate; the lower usually shorter, ventricose, 2-plicate and with 3 small more or less spreading lobes. Stamens 4, didynamous, usually included and ascending under the galea, rarely exserted, all fertile or the posterior pairs with reduced sterile or obsolete anthers; fertile anthers contiguous or sometimes coherent in pairs, densely woolly; cells distinct, parallel or oblique, often calcarate at the base. Style undivided; stigma terminal. Capsule ovoid, loculicidal; valves entire, with central placentæ. Seeds very numerous, small, minutely roughened or reticulated. —Chiefly perennial herbs exclusively of subtropical and western tropical America, extending from Northern Mexico to Peru, growing chiefly upon the mountains and at middle altitudes. Habit erect, decumbent, or rarely somewhat scandent. Leaves opposite, entire, dentate, serrate, crenate, or in one species dissected. Flowers orange to crimson, showy, spicate- or racemose-paniculate, or somewhat corymbous.—Nov. Gen. et Spec. ii, 335, t. 167–169; Benth. in DC. Prodr. x, 539.

§ 1. EUPHRASIOIDES Benth. l. c. Fertile stamens 4, equal or nearly so; a very rudimentary fifth sometimes present.

* Leaves bipinnatifid.

1. L. MULTIFIDA HBK. Perennial, well-marked in the genus by its dissected foliage, scabrous-puberulent to densely and somewhat glandularly pilose: base a small woody tuber: flowers in the typical form 12 to 16 lines in length.—HBK., l. c., 339. *L. laciniata* Mart. and Gal., Bull. Acad. Brux. xii. 2, 32 (incl. var. *pilosa*, the commoner form).—Common at moderate altitudes (2,500 to 8,000 or even 11,000 feet), throughout Central and Southern Mexico to Guatemala; San Luis Potosi, *Parry* and *Palmer*, 687; Jalisco, *Pringle*, 2833; Valley of Mexico, *Bourgeau*, 612; Mexico, without locality, *Graham*; Chiapas, *Ghiesbrecht*, 704; Guatemala, Pl. Guat. *Donnell-Smith*, 813, 4013; Orizaba, *Seaton*, 134; Sierra de San Felipe, Oaxaca, *Pringle*, 4829, and *Nelson*, 1098, 1798.

VAR. GRANDIFLORA Benth. Flowers considerably larger, becoming 2 inches in length.—Benth., l. c., 540. *L. grandiflora* Benth., acc. to Linden, Cat. n. 10 (1855), 6.—Jalisco, *Hartweg*,

187; State of Mexico, *Pringle*, 3149; Guanajuato, *Dugès*, 385. Intermediate forms passing to the type are represented by *Ghiesbrecht's* 84 from Chiapas and his unnumbered specimen from the Plateau of Mexico, as well as by *Coulter's* 1356, without exact locality.

* * Leaves serrate, crenate, or entire.

+– Anther-cells conspicuously calcarate at base.

++ Calyx-teeth subulate: leaves entire or nearly so.

2. L. LONGIFOLIA Benth. Calyx 5 to 7 lines long: leaves oblong-linear, attenuate at both ends, acute, the larger 2 inches long, 1½ to 2½ lines broad; margins recurved.—Pl. Hartw. 22, and in DC. Prodr. x, 540.—Northwest Mexico in the Sierra Madre, *Seemann;* Jalisco near Balaños, *Hartweg*, 188.

3. L. HYSSOPIFOLIA Gray. Calyx 3 to 4 lines long: leaves mostly shorter and broader, oblanceolate to spatulate, acute or obtusish, 9 to 18 lines long, 2½ to 3½ lines broad.—Proc. Am. Acad., xxi, 404.—Southwestern Chihuahua, *Palmer*, 266.

++ ++ Calyx-teeth oblong, obtusish: leaves serrate.

4. L. PRINGLEI. Tomentulose, 3 to 5 feet high, branched from a somewhat ligneous base: stems terete: leaves elliptical, obtuse, 4 to 9 lines long, nearly half as broad, obtusely serrate from the middle, narrowed and shortly petiolate at the base: racemes several, rather dense; pedicels only a line or two in length: flowers 2 inches or more in length.—Garden and Forest, viii, 275, t. 39.—On cold ledges of Sierra de San Felipe, altitude 10,000 feet, 25 September, 1894, *Pringle*, 4927; and near Tamazulapam, altitude 7,800 feet, 13 November, 1894, *Nelson*, 1953.

+– +– Anther-cells obtuse or acute at base, but not distinctly spurred: leaves serrate.

++ Flowers small: corolla 7 to 10 lines long.

5. L. BREVIFOLIA Benth. Pubescent throughout: flowers subsessile.—Benth. in DC. Prodr. x, 540.—Chachapoyas, Peru, *Mathews*, 3138.

6. L. PARVIFLORA Hemsl. Glabrous or glabrate: flowers short-pediceled.—Biol. Cent.-Am. Bot., ii, 465. "Mexico, without locality, *Tate*, 31, *Mairet*, 56."

++ ++ Flowers larger; corolla 14 lines to 2½ inches long.

— Calyx very irregular, deeply cleft anteriorly; lobes lanceolate, usually acute.

7. L. XALAPENSIS HBK. Calyx slender, spathe-like, 6 to 8 lines long: corolla 15 to 18 lines long.—Nov. Gen. et Spec., ii, 388. *L. spathacea* Benth., l. c., 539.—Jalapa, *Humboldt* and *Bonpland;* Orizaba, *Botteri*, 383, 1169. Bentham's *L. Xalapensis* of the Podromus exclusive of Humboldt's specimen may well have been the following.

= = Calyx less irregular: lobes usually broad, ovate or oblong, obtusish, or in the first linear-oblong and acutish.

8. L. EXSERTA. Puberulent: stem subtetragonal, copiously branched above: leaves narrowly lanceolate, sharply serrate, acute to acuminate, 1 to 2½ inches long, 3 to 5 lines broad, narrowed at base to slender petiole: racemes lax and secund; pedicels 2 to 4 lines long: calyx glabrous, 4 to 6 lines in length; the lobes narrowly oblong: corolla 1 to 1½ inches long, densely pubescent: stamens conspicuously exserted.—Valley of Mexico, *Bourgeau*, 986, *Schaffner*, 367; and in rich ravines of Sierra de Clavellinas, Oaxaca, altitude 9,000 feet, 18 October, 1894, *Pringle*, 4995; also on top of Sierra Madre near Chilpancingo, altitude 9,000 to 10,200 feet, 24 December, 1894, *Nelson*, 2216, and at Tlalixtaquilla, *Nelson*, 2261.

9. L. DEPENDENS Benth. Hirsute: leaves ovate-lanceolate: calyx-lobes broad and often serrate: flowers rather long-pediceled, 1½ inches long: flowering branches pendulous.—Benth., l. c., 539.—"Guatemala, *Skinner*." *Ghiesbrecht's* 74, 173, 176, and 706 from Chiapas may be doubtfully placed here, and *J. Donnell-Smith's* 2162, which we have not seen, has also been referred to this species.

10. L. MACRANTHA Mart. and Gal. Pubescent with soft spreading articulated hairs: stem rather stout, erect from a somewhat decumbent base: leaves ovate, subsessile, doubly and rather deeply crenate-serrate, obtuse: racemes erect: calyx-lobes entire: corolla 2½ inches long, red dorsally and yellow ventrally: stamens not produced beyond the galea.—Bull. Acad. Brux., xii, 2, 32. *L. betonicæfolia* Benth., l. c.—South Mexico, 7,500 to 10,200 feet altitude, on Sierra de San Felipe, Oaxaca, *Pringle*, 4854, *Nelson*, 1070, 1343. Originally collected in Orizaba by *Galeotti*.

11. L. OVATA Mart. and Gal., l. c., 33. Similar to the last, but with flowers much shorter, 1¼ to 1½ inches long: inflorescence more leafy: calyx-lobes more or less serrulate.—Oak woods, Sierra de San Felipe, Oaxaca, *Pringle*, 4762; in neighboring locality, *Nelson*, 1118. Originally collected in the same general region by *Galeotti*, 989.

§ 2. HEMISPADON Benth. Fertile stamens only 2, or the posterior pair at least much shorter and with reduced anthers.

* Leaves ovate or oblong, broad at base, sessile or nearly so; Mexican and Central American species.

+ Some or all of the calyx-lobes serrate.

12. L. RHINANTHIFOLIA HBK. Leaves very sharply and doubly serrate: flowers not densely aggregated: tube of the calyx short, campanulate, obscurely 2-3-nerved at each sinus.—Nov. Gen. et Spec., ii, 337, t. 169.—Common: San Luis Potosi, *Schaffner*, 750; *Parry* and *Palmer*, 686; Valley of Mexico, *Bourgeau;* Zimapan, *Coulter*, 1357; Orizaba, *Seaton*, 464; State of Mexico, *Pringle*, 5335; Guanajuato, *Dugès*, 387; Oaxaca, *Pringle*, 4661;

Nelson, 1040, 1131. *Andrieux'* 158, from Gonocatepec, referred by Hemsley to *L. viscosa*, has the pubescence, serrulate calyx-lobes, and elliptical rameal leaves of the present species, of which it is probably only a small and more densely-flowered form.

+ + Calyx-lobes entire: corolla tubular, scarcely ventricose.

++ Inflorescence loose.

13. L. SMITHII. Habit of the preceding: leaves of the stem ovate, sharply serrate, acute, somewhat larger, 2 inches long, an inch broad; the rameal ovate, subcordate, sessile, not elliptical and shortly petiolate as in the preceding: inflorescences considerably branched: calyx-tube short-cylindrical, 3 lines long; lobes lanceolate, acute, entire, about equal in length; nerves from the sinuses distinct, single or double: corolla 2 to $2\frac{1}{4}$ inches long.—Mountains of Jayacatlan, Oaxaca, altitude 5,000 feet, 13 August, 1894, *L. C. Smith*, 155.

++ ++ Inflorescence dense.

14. L. VISCOSA HBK. More or less glandular-tomentose: stem rather rigid, terete: leaves ovate-oblong, thickish, sharply-serrate.—HBK. l. c., 338. *L. cordata*, Cham. and Schlecht. Linnæa, v, 103. *L. coccinea*, Gray, Proc. Am. Acad., xxi, 404 (only a less pubescent form).—One of the commonest species throughout the whole length of Mexico; Sonora, *Lloyd*, 437; Chihuahua, *Palmer*, 258; *Pringle*, 656; Jalisco, *Palmer*, 578; *Pringle*, 2133, 2339; Zacatecas, *Hartweg*, 189; Huasteca, *Ervenberg*, 112; Zimapan, *Coulter*, 1358; Orizaba, *Bourgeau*, 2424; *Bilimek*, 285; *Botteri*, 86, 149; *Seaton*, 135; Oaxaca, *Pringle*, 4879; *Nelson*, 1199, 1245; Chiapas, *Ghiesbrecht*, 96, 703; Guatemala, *J. Donnell-Smith*, 4016; Mexico without locality, *Sumicrast.* So far as the characterization shows, *L. Viejensis* Oerst., Vidensk. Meddel. Kjöben., 1853, 28, from Nicaragua is also the same.

* * Leaves lanceolate, narrowly oblong, elliptical or linear, narrowed at the base, and often petioled.

+ Posterior filaments bearing reduced villous anthers.

++ Corolla short for the genus, 8 or 9 lines long: leaves incisely serrate: species of Ecuador.

15. L. SUBINCISA Benth. "Habit of *L. brevifolia:* leaves lanceolate, an inch or less in length."—Benth. l. c., x, 540.—Andes of Quito, *Jameson.*

++ ++ Corolla longer, an inch or more in length.

= Calyx-lobes serrulate.

16.? L. SYLVATICA HBK. "Somewhat twining: leaves lanceolate, acute, narrowed at base: corolla roseate."—HBK. l. c., ii, 337.—Near Ayavaca, Peru, *Humboldt* and *Bonpland.* A very

dubious species, founded upon imperfect material, but, if correctly described, belonging here.

= = Calyx costate; segments entire.

a. Mexican species.

17. L. TENUIFOLIA Mart. and Gal. l. c. Stem copiously branched above; branches simple, slender, ascending, very leafy: leaves narrow, lance-linear, 6 to 10 lines long, crenate-serrulate; margins recurved: inflorescence dense.—Walpers, Rep. vi, 652. *L. linearis*, Benth. l. c., x, 541.—Valley of Mexico, *Bourgeau*, 1113; *Schaffner*, 368; Chiquihuite, *Bilimek*, 284; Tula, *Berlandier*, 1261; San Luis Potosi, *Parry* and *Palmer*, 673. Originally collected in E. Oaxaca by *Galeotti*.

b. South American species.

18. L. VIRGATA HBK. Leaves linear-lanceolate, sharply but finely serrate: calyx-lobes lanceolate, acute, longer than the tube.—HBK. l. c. ii, 336, t. 167.—Near Quito, *Humboldt* and *Bonpland*, *Hall*, *Jameson*, *Hartweg*, *Couthouy*.

19. L. LOXENSIS Benth. Leaves linear-lanceolate: segments of the calyx scarcely longer than the tube.—Pl. Hartw. 147, and in DC. Prodr. x, 541.—Mountains of Loxa, United States of Columbia, *Hartweg*, 824. A doubtful species, intermediate between the preceding and following.

20. L. SERRATIFOLIA HBK. Leaves linear-lanceolate, conspicuously and incisely serrate with short divergent teeth.—HBK. l. c. ii, 336, t. 168.—Near Bogota, *Humboldt* and *Bonpland*, *Goudat*.

+ + Posterior filaments glabrous at the summit and anantherous or nearly so.

++ Leaves quite entire.

21. L. INTEGERRIMA Donnell-Smith. Nigrescent in drying: leaves narrowly lanceolate, attenuate at both ends, $\frac{3}{4}$ to $1\frac{1}{2}$ inches long, $1\frac{1}{2}$ to $2\frac{1}{2}$ lines wide, conspicuously 1-nerved; veins very obscure: calyx indistinctly 8-costate.—Bot. Gaz. xiii, 189.—Pansamala, Alta Verapaz, Guatemala, altitude 4,000 feet, *von Tuerckheim* (Donnell-Smith's Pl. Guat.), 1112.

++ ++ Leaves serrate, serrulate, or crenate.

— Leaves an inch or more in length.

22. L. LANCEOLATA Benth. Whole plant nigrescent in drying: branches divaricate: leaves narrowly lanceolate, finely, sharply and irregularly serrate, 1 to $1\frac{1}{2}$ inches long, $1\frac{1}{2}$ to $2\frac{1}{2}$ lines wide: calyx conspicuously 12-costate; segments linear-lanceolate, acute, spreading or even reflexed.—Benth. in DC. Prodr. x, 542.—South Mexico, Chiapas, *Ghiesbrecht*, 144, 705; Guatemala, *Donnell-Smith's*, 398, 3100.

23. L. Nelsonii. Pubescent, drying green: leaves thin, oblong, acute, irregularly dentate, the larger 2 to 3 inches in length, 4 or 5 lines broad: calyx pubescent, not distinctly ribbed, 6 lines long: segments lanceolate, acute, erect: corolla over 2 inches long, red, paler and yellowish toward the base.—Six miles above Dominguillo, Oaxaca, altitude 4,500 to 5,000 feet, 30 October, 1894, *Nelson*, 1833.

= = Leaves half inch or less in length.

24. L. microphylla Mart. and Gal. Leaves oblong, crenate-serrulate, 3–4 (–6) lines long, a line broad; those of the branches reflexed: calyx glabrous; teeth very short.—Bull. Acad. Brux. xii, 2, 31. *L. parvifolia*, Benth. l. c. x, 542.—Oaxaca, *Galeotti*, 1005; and on granitic hills at base of Sierra de Clavellinas, altitude 6,000 feet, *Pringle*, 6000.

25. L. Gutierrezii Oerst. Shrub, 3 to 4 feet high, somewhat scandent: leaves lanceolate-elliptical, 6 to 10 lines long, 2 lines broad, somewhat scabrous: calyx somewhat villous, teeth much shorter than the tube, and (from figure of Seemann) entire.—Vidensk. Meddel. 1853, 29. *L. scabra* Benth. in Seem. Bot. Herald, 177, t. 33.—Mountains between Cartago and Candelaria, Costa Rica, *Oersted;* Volcano of Chiriqui, Veraguas, *Seemann.*

This species in the Index Kewensis is incorrectly said to be Venezuelan. Bourgeau's 101, referred hither by Hemsley, is *L. rhinanthifolia.*

26. L. gracilis. Scarcely shrubby, 1 to 1½ feet high: stems slender, terete, puberulent in lines: leaves elliptic-oblong, obtuse, narrowed at the base to short slender petioles, crenate-dentate, thin, not at all rugose, nearly or quite smooth, the larger ones 9 lines long, 3 lines broad: racemes simple, rather loose, leafy to the apex: segments of the calyx ovate-oblong, obtuse, nearly always crenate-dentate: corolla 1¼ to 1½ inches long, red with yellowish throat, moderately ventricose.—Summit of Sierra Madre near Chilpancingo, Guerrero, altitude 9,000 to 12,000 feet, 24 December, 1894, *Nelson*, 2234.

The following distributed as species of *Lamourouxia* belong elsewhere:

Mandon's 479 = *Gerardia* sp.
Bang's 543 = *Gesnera* sp.

IV. *Miscellaneous New Species.*

Unona Panamensis Robinson. A small tree, 15 to 20 feet high: branches brown with lighter colored lenticels; the young parts finely rufous-tomentose with simple hairs: petioles a line or two in length: leaves oblong or elliptic, shortly acuminate, somewhat narrowed at the base, entire, 4 to 8 inches long, about a third as broad, glabrous above, covered beneath especially upon the veins with an appressed rufous silky pubescence: peduncles opposite the leaves, rather short, 4 to 6 lines in length, bearing at the summit a suborbicular cordate bract half inch in diameter (rarely larger and more like the leaves, rarely absent) and 1 or 2 elongated curved pedicels, slightly thickened near their summits and 3 to 3½ inches long: calyx-segments ovate-triangular, a line in length: petals 6, equal, lance-linear, nearly erect, finely pubescent upon the outer surface, minutely granulated within, 6 to 8 lines long; the edges revolute; the tips incurved: maturing carpels 5 to 12, oblong, a little over half an inch in length, 5 lines in diameter, very slightly torulous, rounded at each end; stipe slender, 3 to 4 lines long: seeds about 6, disk-shaped.—Collected by Sutton Hayes in woods near Gatun Station on the Panama Railway, 30 July, 1860.

Unona bibracteata Robinson. Branchlets light brown, nearly or quite glabrous: leaves lance-oblong, narrowed to an obtuse apex, contracted below to a very short thickish petiole, green and glabrous upon both surfaces, 2¼ to 3 inches long, an inch in breadth, firm but not coriaceous in texture: peduncles opposite the leaves, bearing two very unequal suborbicular cordate bracts; the lower one a third to half inch, the upper only a line in diameter; pedicel recurved, slender, about an inch in length: segments of the calyx ovate, 2 lines in length: petals linear-oblong, obtusish, 8 lines in length: maturing carpels about 15, glabrous, two-seeded, 4 lines long, 3 lines in diameter, subtruncate at apex and base, somewhat constricted in the middle; stipes slender, 3 lines in length; seeds disk-shaped, 1½ lines thick. —Collected by Charles Wright in Nicaragua upon the U. S. North Pacific Exploring Expedition in 1855.

The only other *Unona* reported from Central America, the rather doubtful and imperfectly described *U. violacea* Dunal, has according to the original figure in Dunal's monograph a considerably larger flower with broader petals and no bracts. All efforts to identify the two species here described with those of the Old World have failed and their occurrence does not suggest an introduced character.

Malvaviscus Pringlei E. G. Baker. Caule ligneo, foliis membranaceis viridibus cordatis acute palmate-5-lobatis, lobo medio majore, præcipue junioribus utrinque stellato-pubescentibus serratis petiolatis, floribus maximis axillaribus solitariis vel ad extremitatem ramulorum subracemosis, bracteolis ligulatis calyce brevioribus, sepalis triangularibus vel ovatis acutis intus margine

cinereo-pubescente, columna staminea exserta petalorum longitudinem dimidio excedente, carpellis nigrescentibus vel subnigrescentibus superne in medio sulcatis inferne carinatis.—Collected by C. G. Pringle, on rocky hills bordering Lake Cuitzeo, Michoacan, 20 July and 26 October, 1892 (No. 4132). Stem 10 to 20 feet high, woody, younger branches at the extremities covered with a scurfy cinereous pubescence. Leaves membranous, green, cordate; palmately 5-lobed, middle lobe longest, serrate, pubescent on both surfaces especially the young leaves, length of leaves on specimen 3–3½ inches, breadth 3–4 inches, petioles 1½–3 inches long covered with cinereous pubescence. Flowers axillary, solitary or at the end of the branches somewhat racemose. Bracts strapshaped, half inch long, shorter than the sepals. Calyx three-fourths inch long, sepals triangular or ovate, acute, inside the margin cinereous-pubescent. Petals convolute, 2¾ inches long. Stamineal tube exserted 1½ inches. Styles 10, capitately stigmatose. Fruiting peduncles straight, stiff, terete, generally slightly bent just below the fruit. Carpels 5, black or brownish, black on the back, grooved above, the groove gradually passing into a ridge below, third inch long.

This plant was distributed as *Malvaviscus acerifolius* Presl, of which there is a specimen gathered by Hænke in Mexico in the Herb. Mus. Brit. *M. Pringlei* differs from *M. acerifolius* Presl, in its leaves, bracts and flowers. The leaves are much deeper lobed in the former than in the latter and in *M. Pringlei* the bracts are shorter than the calyx and the petals nearly 3 inches long; in *M. acerifolius* the bracts are the same length as the calyx and the petals an inch long. *M. Pringlei* differs from *M. cinereus* Bak. fil. MS. in the texture of its leaves and its much larger flowers. I have named this very showy plant in honor of Mr. C. G. Pringle, who has done so much to further our knowledge of the Mexican flora.

Laphamia Toumeyi Robinson and Greenman. Many-branched from a knotted woody base, densely glandular-puberulent; branches about 4 inches long, erect, terete, striated, simple or again branched, rather cinereous: leaves spatulate, including the petioles 3 to 5 lines long, a line to a line and a half broad; entire, obtuse, thickish, cinereous; the petiole channelled above; heads discoid, 2½ to 3 lines high, equally broad, about 35-flowered, terminal upon the branchlets, together forming a pyramidal or subcorymbous inflorescence; involucral scales sub-biseriate, nearly equal, acute, the outer thickish, carinate, densely puberulent, the inner thinner and flatter: pappus of a single awn: tube of the corolla glandular-pubescent: achenes compressed, oblong-linear, about a line long, puberulent.—Collected by Prof. J. W. Toumey, in the Grand Cañon, 12 July, 1892 (No. 645).

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Presented May 13, 1896.

I. — REVISION OF THE GENUS TRIDAX.

TRIDAX, L. (Name supposed to come from *τρίς*, thrice, and *δακεῖν*, to bite, referring to the trifid rays.) — Heads terminal upon long peduncles, heterogamous and radiate or rarely homogamous and discoid. Involucre campanulate to sub-cylindric, 2–several-seriate, very rarely sub-uniseriate; scales all or at least the inner scarious and commonly purple-margined. Receptacle mostly conical. Ray-flowers, when present, fertile; ligules yellow, white, or roseate, clearly or obsoletely bilabiate; external lip 3-toothed or deeply trifid, obovate or oblong in outline, patulous; the inner of 1 or 2 short erect teeth or sometimes wanting; disk-flowers usually (if not always?) yellow, regular, 5-toothed. Anthers short, sagittate at the base, appendaged at the apex. Style-branches terminating in short or long subulate appendages. Achenes turbinate, hirsute or upwardly silky-villous, very rarely glabrous or nearly so. Pappus of several to many narrow ciliate scales attenuate to plumose awns (except in *C. dubia*). — Hort. Cliff. 418, & Gen. no. 979; DC. Prodr. v. 679; Benth. & Hook. f. Gen. ii. 392; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 247. *Bartolina*, Adans. Fam. ii. 124. *Sogalgina*, Cass. Bull. Philom. 1818, & Dict. Sci. Nat. xlix. 397. *Balbisia*, Willd. Spec. iii. 2214. *Galinsogea*, HBK. Nov. Gen. & Spec. iv. 252, t. 386. *Ptilostephium*, HBK. l. c. 253, t. 387, 388. *Carphostelphium*, Cass. Dict. Sci. Nat. xliv. 62. *Mandonia*, Wedd. Bull. Soc. Bot. Fr. xi. 50, t. 1, not Schz. Bip. — Pubescent annuals or perennials not rarely lignescent at the base, with leaves opposite, petiolate or subsessile, subentire or more often dentate or irregularly cleft or pinnatifid. About 22 known species, two of them of the S. American Andes, the others confined to Mexico, except a single species which extends also to Mauritius and E. India.

Subgenus EUTRIDAX. Scales of the involucre 2–several-seriate: achenes densely silky-villous or hirsute: pappus scales terminating in plumose awns.

§ 1. Scales of the involucre very unequal, regularly imbricated in several to many series, gradually decreasing in size; the outermost very short, mostly scarious and rounded at the summit, very rarely somewhat herbaceous or (in *T. angustifolia*) subacute.

* Heads discoid: pappus shorter than the achenes.

1. T. brachylepis, Hemsl. "Annual, erect," with "slender glabrescent branchlets" and "thickish ovate-lanceolate dentate or sometimes obscurely lobed leaves." — Biol. Cent.-Am. Bot. ii. 207. — Cordillera of Oaxaca, altitude 7,000 feet, *Galeotti*. The only specimen, seen by the writers, closely approximating in its characters Mr. Hemsley's description is no. 1423 of *E. W. Nelson*, collected in the Valley of Oaxaca, altitude 5,500 to 7,500 feet, 20 September, 1894. But although only the upper portion of the root is at hand it is not unlikely perennial.

2. T. tuberosa. Distinctly perennial; the elongated woody root at places tuberous-thickened: stem decumbent, subsimple, 3 feet in height, leafy to the middle, hirsute: leaves hirsute upon both surfaces, 3-nerved, 2 inches long, nearly half as broad, cuneate at the base and 3-cleft with sharply toothed acute lobes: heads about 6, nearly 7 lines long and 6 lines in diameter: pappus only a third to half the length of the achene. — Collected by *C. G. Pringle*, on the Sierra de San Felipe, Oaxaca, altitude 7,000 to 8,500 feet, 17 November, 1894, no. 5644 a.

3. T. Pringlei. Perennial, decumbent, much branched from near the base, 2 feet high, pubescent throughout but less hirsute than the preceding: root woody, tuberous-thickened at intervals: leaves lanceolate, dentate or subentire, obtusish, 1 to 1½ inches long, scarcely a third as broad, 1-nerved: heads 2 to 4, very similar in all respects to those of the preceding. — Collected by *C. G. Pringle*, on the Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 7 September, 1894, no. 5644. In technical characters very close to the preceding species, but with markedly different foliage.

* * Heads radiate: ligules evident.

+ Mexican species.

++ Rays yellow.

= Pappus very short or none.

4. T. trilobata, Hemsl. l. c. 208. Erect much branched glandular-pubescent annual, a foot or two high, with lance-oblong obtusish and coarsely few-toothed or laciniate leaves (cuneate at the base) and numer-

ous showy heads 10 lines to an inch in diameter, with dark purple involucre and broad bright orange-yellow rays. — *Galinsoga trilobata*, Cav. Icon. iii. 42, t. 282; Bot. Mag. t. 1895; Sweet, Brit. Fl. Gard. t. 56. *Sogalgina trilobata*, Cass. Dict. Sci. Nat. xlix. 397. — Valley of Mexico, *Bourgeau*, no. 846; near Chapultepec, *Schaffner;* and on calcareous bluffs, Flor de Maria, *Pringle*, no. 3148; also in Michoacan in fields near Patzcuaro, *Pringle*, no. 4271. The form without any trace of pappus does not appear to differ in any other particular. A specimen cultivated in the Botanic Garden of Harvard University has leaves oblong, subentire.

= = Pappus about equalling or somewhat exceeding the achenes.

5. T. balbisioides, Gray. Annual, much branched, pubescent: branches divaricate or the lowest decumbent: leaves from lanceolate and irregularly toothed to deeply ternately cleft or pinnately parted: heads rather numerous, nearly or quite an inch in diameter, with convex or conical disk and spreading showy rays: ligules (exclusive of tube) 2½ to 4 lines long, as broad or broader. — Proc. Am. Acad. xv. 39. *T. coronopifolia*, Gray, l. c., not Hemsl. *Galinsogea balbisioides*, HBK. Nov. Gen. & Spec. iv. 253, t. 386. *Sogalgina balbisioides*, Cass. l. c. xlix. 398. — Originally collected in Guanajuato between the Valley of Santiago and Lake Palangeo, at 5,500 feet altitude, by *Humboldt & Bonpland.* It is described and figured by Kunth, l. c., as having entire or repand ligules of suborbicular contour. No plants with this character have since been observed, and we follow Dr. Gray in referring to the species the following, which differ only in their more or less distinctly 3-toothed rays: *Schaffner's* no. 238, and *Parry & Palmer's* no. 509, both from San Luis Potosi. Nor does *T. leptophylla*, Gray (l. c. xxi. 391), from Chihuahua (*Palmer's* no. 425, and *Pringle's* no. 769), appear to differ by any constant or satisfactory character. A form from San Luis Potosi, represented by *Parry & Palmer's* no. 508, has the ligules sometimes 3-toothed and sometimes divided nearly to the base into 3 oblong lobes. This plant was rather confidently referred by Dr. Gray (l. c. xv. 39) to *T. coronopifolia*, but it differs from that species decidedly in its much imbricated inolucre, with very unequal and rounded scales, and in its attenuate chaff. Nor is the ligule strap-like. In stating it to be so Dr. Gray had presumably observed only one of the long oblong lobes of a very deeply trifid ray.

6. T. petrophila. Distinctly perennial from a lignescent base: stems several, very slender, erect or nearly so: branches ascending: leaves very narrow, linear, entire, toothed, or with 2 or 3 short linear lobes:

ray-flowers with ligules much smaller than in the preceding, about 1½ lines in diameter: the tube being relatively very long and slender (4 to 5 lines in length): chaff terminating in a long and slender awn. — *T. balbisioides*, Gray, l. c. xxii. 430, not xv. 39. *T. balbisioides*, var. *tenuifolia*, Gray, (ined.) in distribs. Palmer and Pringle. — Jalisco, on the Rio Blanco, *Palmer*, no. 569; on rocky hills near Guadalajara, *Pringle*, nos. 2179, 2556. The later collections of Mr. Pringle show this plant quite distinct in its woody base and reduced rays from *T. balbisioides*.

++ ++ Rays white, purplish, or roseate.

= Pappus much longer than the achene.

7. T. rosea, Schz. Bip. in herb. Hirsutulous annual, leafy near the base and often with spreading branches: leaves linear-oblong, irregularly toothed or trifid with toothed lobes: peduncles becoming very long (6 to 10 inches), quite simple, naked or bearing 1 or 2 minute alternate bracts: heads large, with the spreading rays an inch or more in diameter: ligules oblong, 3 to 5 lines in length, slightly 3-toothed at the apex. — A good but apparently unedited species, founded by Schultz upon *Schaffner's* no. 60, from Guadalupe, and collected in the same locality by *Bilimek* in 1865, no. 488, and *Bourgeau*, no. 586; also in Valley of Mexico, *Schaffner*, no. 265.

= = Pappus shorter than or barely equalling the achene.

8. T. Palmeri, Gray. Pubescent or puberulent, 2 feet high, usually with a few ascending branches, naked above: leaves mostly much cleft or deeply and laciniately parted into narrow acute segments: rays broad, obovate, truncate, essentially entire, roseate: disk-flowers greenish yellow. — Proc. Am. Acad. xv. 38. — San Luis Potosi, on rocky bluffs at Alvarez, altitude 8,000 feet, *Parry & Palmer*, nos. 489, 490, 482½, also *Schaffner*, no. 236.

Var. indivisa, Robinson & Seaton. Somewhat stouter and more densely pubescent: leaves ovate, subhastate, abruptly contracted into a petiole, repand-dentate, not lobed. — Proc. Am. Acad. xxviii. 109. — Ledges of cañons on mountains near Lake Chapala, Jalisco, *Pringle*, no. 4332. Mr. Pringle states that the base is perennial.

+ + South American species, of the Andes of Bolivia and Ecuador: leaves narrow: pappus longer than the achenes.

9. T. Mandonii, Schz. Bip. Branched, hirsute: leaves sinuate or repand-dentate: involucral scales rounded at the apex, sparingly puberulent near the ends or quite glabrous: rays very small. — Bull. Soc. Bot. Fr. xii. 82, & Linnæa, xxxiv. 536. *Mandonia Boliviensis*, Wedd. Bull.

Soc. Bot. Fr. xi. 51, t. 1. — Near Sorata, Province of Larecaja, altitude 2,690 to 3,000 meters, *Mandon*, no. 289.

10. T. angustifolia, Benth. & Hook. f. Decumbent and rooting at the nodes, pubescent: leaves lance-linear, acute, denticulate or entire: involucral scales acutish, pubescent or puberulent on the outer surface; the outer ones inclining to be squarrose: ligules oblong, 2 or 3 lines in length. — Gen. ii. 392. — Collected in the Andes of Ecuador by *Spruce*, no. 5582.

§ 2. Involucral scales 2–3-seriate, less unequal; the outer often herbaceous and acutish.

* Leaves ovate to linear, pubescent to densely hirsute but not canescent.

+ Leaves relatively broad, subentire, toothed, or divided into a few rather broad lobes.

++ Pappus longer than or about equalling the achenes.

= Perennials with ligneous or lignescent base: rays short, nearly orbicular, 3-toothed.

11. T. procumbens, L. More or less densely hirsute with white hairs: stems several to many from a woody root or stock, decumbent or procumbent: leaves lanceolate to ovate-lanceolate, acute, sharply repand- or sinuate-toothed, cuneate at the base: scales of the involucre oblong, acutish, usually villous-hirsute: chaff persistent: rays yellow or (?) white. — Spec. ii. 900. *Amellus pedunculatus*, Ort. *fide* Willd. Enum. 916. *Balbisia elongata*, Willd. Spec. iii. 2214. *B. pedunculata*, Hoffmgg. Verz. Pfl. 228. *B. divaricata*, Cass. Ann. Sci. Nat. xxiii. (1831) 90. — The most widely distributed species; Monterey, North Mexico, *Eaton & Edwards*, also *Pringle*, no. 1920; Wartenberg, near Tantoyuca, *Ervendberg*, no. 61; San Luis Potosi, *Parry & Palmer*, no. 520; "Coahuila and Nuevo Leon," *Palmer*, nos. 629, 2061; Orizaba, *Schaffner*, *Gray*, *Botteri*; Jalisco, *Palmer*, no. 297; Colima, *Palmer*, no. 1186; Oaxaca, *L. C. Smith*, no. 423, *E. W. Nelson*, nos. 2582, 2773; Guatemala, nos. 2370, & 4200 of Donnell Smith's sets. Also on Elliott's Key, Fla., *Simpson*, no. 553; Cuba, *Wright*, no. 2861. Introduced and now abundant in E. India and Mauritius.

Var. ovatifolia. Less hirsute, pubescence shorter, finer, and tending to become fuscous: base of stem ligneous: leaves ovate, acutish, serrate with small subequal obtusish teeth, finely pubescent upon both surfaces, 8 to 10 lines long, 6 to 8 lines broad, rather abruptly contracted at the base into short petioles: involucral bracts very broad, mostly obovate. — Collected by *E. W. Nelson* in the vicinity of Yalalag, Oaxaca, July, 1894, no. 948. Rather well marked in its foliage and possibly a distinct

species, but agreeing with the type in all floral characters except the somewhat broader involucral scales.

= = Annuals.

12. T. obovata, Turcz. Low, 4 to 6 inches in height: leaves obovate, subentire, obtuse: ligules short, yellowish. — Bull. Soc. Nat. Mosc. xxiv. 187; Walp. Ann. 238. — S. Mexico, on Sierra San Pedro, Nolasco, Talea, &c., *Jurgensen*, no. 124. Here we would refer specimens collected near Acapulco by *Palmer*, no. 165.

13. T. erecta, Gray. Slender, erect, hirsutulous, branching, a foot or so in height: leaves ovate-lanceolate and serrate or broadly ovate in outline and rather deeply 3-parted with acutish lobes: heads rather small: involucre ovate; one or two of the outer scales often narrow, oblong, and spreading: ligules short, only a line or two in length, 3-toothed, yellow. — Proc. Am. Acad. xxi. 390, 433. — Southwestern Chihuahua, *Palmer*, no. 285.

14. T. tenuifolia, Rose. Erect, pubescent, 1 to 2 feet high, branching: leaves ovate, petiolate, dentate but not lobed: outer scales of the involucre acuminate: rays conspicuous, 3 to 5 lines long, pale yellow or "bright white." — Contrib. U. S. Nat. Herb. iii. 319. *T. bicolor*, Gray, Proc. Am. Acad. xxi. 391, as to pl. Palmer. — Southwestern Chihuahua, on mountain sides above Batopilas, *Palmer*, no. 130.

Var. microcephala, Rose, l. c. Described as differing in its smaller heads and "slightly different disk corollas." — "Near Lodiego, *Palmer*, no. 1611."

+ + Pappus shorter than the achenes.

= Annual species of Northwestern Mexico: heads large, an inch in diameter.

15. T. bicolor, Gray. Erect annual, with leaves ovate to rather narrowly oblong-lanceolate, serrate-dentate, not lobed, narrowed to slender petioles: ligules reddish or purplish, cuneate-oblong, 3-toothed. — Pl. Fendl. 104. — Llanos in the Sierra Madre, W. Chihuahua, *Wislizenus*, no. 214; also among rocks, Bachimba, *Thurber*, no. 833, and on rocky hills near the town of Chihuahua, *Pringle*, no. 638.

= = Species of Southern Mexico, lignescent at the base.

16. T. Galeottii, Klatt. "Stem terete, branched, pilose: leaves petiolate, cuneate, irregularly lobed, pilose upon both surfaces, 2 inches long, 1½ inches broad, 3-nerved: heads solitary, terminal; involucral scales biseriate, the outer shorter: chaff 3–5-dentate at the apex." — Leopoldina, xxiii. 6. *Ptilostephium Galeottii*, Schz. Bip. *fide* Klatt, l. c. — Between San Andres and San Miguel, *Liebmann*, nos. 588, 693, and

Galeotti, no. 2472. A species not seen by the writers. The description is translated and condensed from the original characterization.

+ + Leaves very narrow, linear or lance-linear, or deeply cleft into narrow divisions: heads rather small, 4 to 6 lines broad: rays small, bilabiate, the external lip trifid.

17. T. coronopifolia, Hemsl. Low, much branched and spreading, pubescent or hirsute; leaves lance-linear, denticulate, lacinately toothed or pinnatifid with narrow linear unequal acute segments: peduncles slender, toward the summit finely strigillose with appressed white hairs, and lacking the glandular-tipped hairs so common in the genus: rays yellow (or white): pappus scales unequal, some of them subulate and ciliated, others plumose with scarcely dilated base. — Biol. Cent.-Am. Bot. ii. 207. *Ptilostephium coronopifolium*, HBK. Nov. Gen. & Spec. iv. 255, t. 387. We have little hesitation in including in this species also *Tridax trifida*, Gray, Proc. Am. Acad. xv. 39 (*Ptilostephium trifidum*, HBK. l. c. 255, t. 388), notwithstanding the considerable difference in the pappus represented by Kunth. After the examination of a number of specimens we doubt the specific significance of the difference in length of the pappus, and as to the difference in the breadth of the scales that is often considerable upon the same achene. — Mexico without locality, *Th. Coulter*, nos. 348, 430, and *Berlandier*; State of Mexico, *Bilimek*, no. 491, also *Bourgeau*, nos. 164, 705; Tacubaya, *Schaffner*; Mt. Orizaba, altitude 9,000 feet, *Seaton*, no. 273; Oaxaca, Soledad de Etla, altitude 5,300 feet, *L. C. Smith*, no. 361, and by same collector at Telixtlahuaca, no. 866; also by *E. W. Nelson*, in Valley of Oaxaca, altitude 5,100 to 5,800 feet, no. 1229. The formal variety ALBORADIATA (*T. trifida*, var. *alboradiata*, Gray, Proc. Am. Acad. xv. 39), with white rays, but apparently without other significant or constant differences, has a somewhat more northerly distribution, having been collected at San Luis Potosi, *Schaffner*, no. 239, *Parry & Palmer*, no. 511; in Jalisco, *Pringle*, no. 2902; and in Guanajuato, *Dugès*, no. 438.

18. T. lanceolata, Klatt. "Lower leaves broadly lanceolate and upper lance-linear, entire: chaff obovate." — Leopoldina, xxiii. 6. — "Tehuacan, *Liebmann*, no. 205; Cuernavaca, *Berlandier*, no. 1063." A species not seen by the writers and (as to description) distinguished from the preceding species chiefly by the characters quoted.

19. T. imbricata, Schz. Bip. "Leaves linear-lanceolate, entire, or 1–3-toothed, pilose, ciliated on the margins: external scales of the involucre obtuse, striate, dorsally puberulent." — Schz. Bip. in Klatt, Flora, 1885, 202. — "Real del Monte, *Ehrenberg*, no. 355." We suspect this to be merely a form of *T. coronopifolia*.

* * Whole plant canescent-tomentose: leaves linear, entire.

20. T. candidissima, Gray. Very white-woolly, 4 to 6 inches high, densely leafy below: leaves 1 to 1¾ inches long, sessile by a sheathing base: peduncles solitary, terminal, naked: heads homogamous: involucral scales lanceolate, acute: pappus long. — Proc. Am. Acad. xv. 39. — On ashy soil, Angostura, San Luis Potosi, *Parry & Palmer*, no. 510. Not since rediscovered.

Subgenus Pseudotridax. Scales of the involucre sub-uniseriate: achenes merely papillose-puberulent or glabrescent: scales of the pappus obtuse or obtusish, laciniately bordered: anomalous species connecting this genus with *Galinsoga*.

21. T. (?) dubia, Rose. Decumbent or procumbent pubescent herb; stems about 2 feet long: leaves ovate, serrate, acutish, petiolate: heads subracemose or subcorymbose, 6 lines in diameter: involucral scales very few, about 5: ray-flowers with short golden yellow 3-toothed ligules. — Contrib. U. S. Nat. Herb. i. 337, t. 33. — Along river bottoms, Colima, *Palmer*, no. 1173; also in lowlands near San Blas, Tepic, *Lamb*, no. 609.

Species (doubtless of *Eutridax* but otherwise) of doubtful affinities: not seen by the writers.

22. T. Ehrenbergii, Schz. Bip. "Stem herbaceous, elongated, climbing, sulcate, sparingly pilose, trichotomous: leaves rhomboidal, slender-petioled, acuminately serrate, 3-nerved, above sparsely pubescent, below pilose upon the nerves: head solitary, terminal, many-flowered: involucre campanulate: scales scarious, laciniate on the margins: chaff scarious, trifid, costate, mucronate: flowers of the disk campanulate, pilose, ciliated on the margin: pappus-scales fimbriate, shorter than the sericeous achene." — Leopoldina xxiii. 6. — "Chinantla, *Liebmann*, no. 598. Leaves 20 lines long, 9 lines broad."

II. — SYNOPSIS OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF THE GENUS MIKANIA.

MIKANIA, Willd. (Dedicated to *Professor Joseph Gottfried Mikan*, of Prague, born 1743, died 1814.) — Cylindrical involucre of four erect concave obtuse or acute equal or subequal scales, sometimes with a shorter external fifth scale. Receptacle small, naked. Flowers 4 (in *M. punctata* "7"), tubular, with campanulate throat and 5-toothed limb. Anthers appendaged at the apex, obtuse or truncate at the base. Style-branches long, filiform-clavellate. Achenes 5-angled, without intermediate ribs,

puberulent or glabrous. Pappus of many setæ in a single row, mostly about equalling or somewhat exceeding the achene, bright white or more commonly sordid, fuscous, or rufous. — Spec. iii. 1742; DC. Prodr. v. 187, vii. 270; Benth. & Hook. f. Gen. ii. 246; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 140. *Willugbæya*, Neck. Elem. i. 82. *Corymanthelium*, Kunze, Linnæa, xx. 19. — Mostly slender shrubby or herbaceous twiners or "rarely erect." Leaves opposite, usually ovate, cordate or hastate, and petiolate. Inflorescence spicately, racemosely, or corymbosely paniculate. A genus of some 175 good species nearly confined to Tropical or Subtropical America. *M. scandens* is also widely distributed in the United States and in the warmer parts of the Old World.

Subgenus 1. CYLINDROLEPIS. Truncate scales of the involucre not at all imbricated but strongly involute, each completely surrounding a flower.

1. **M. globosa**, Coulter. Glabrous or nearly so: leaves ovate, thickish, undulate-dentate, acuminate, rounded at the base, 5-nerved from near the base: heads in dense globose clusters; these in lateral or terminal panicles: each of the four flowers completely enveloped in an involucral scale: mature achenes not seen. — Bot. Gaz. xx. 46, where also called *Willugbæya globosa*. — Santa Rosa, Guatemala, altitude 4,000 feet, *Heyde & Lux* (no. 3430 of Donnell Smith's sets). A noteworthy species differing much in its involucral scales from any other known to us. It is said by Professor Coulter to resemble closely *M. smilacina* in "habit and structure." The likeness, however, does not extend to the heads, which are here completely divided into four compartments by the intrusion of the involute edges of the scales; while in *M. smilacina* the involucre is normally imbricated.

Subgenus 2. IMBRICATÆ. Scales of the involucre imbricated.

§ 1. Heads spicately or racemosely arranged on the opposite spreading branches of ample pyramidal panicles.

* Heads pedicelled.

2. **M. Houstonis**, Willd. Glabrous climbing shrub, with ovate acuminate entire petiolate leaves. — Spec. iii. 1742; DC. Prodr. v. 190. — S. Mexico, Vera Cruz, *Houston*, and (acc. to Hemsl.) "Linden, no. 1169; Yucatan and Tabasco, *Johnson*, no. 25; Guatemala, Las Escamillas, *Hartweg*, no. 535; Chojoja, near Mazatenango, *Bernoulli*, no. 100; Panama, Barbacoas, *S. Hayes*." The only plants in Herb. Gray agreeing with the character of this species are *Ervendberg's* nos. 87, 222, from Wartenberg, Huasteca, Mexico.

* * Heads sessile.

+ Heads very small: pappus bright white: branchlets winged.

3. M. pterocaula, Schz. Bip. Glabrous twiner: leaves ovate, acuminate, dentate, thin, 5-nerved from the base: branchlets 6-winged. — Schz. Bip. in Hemsl. Biol. Cent.-Am. Bot. ii. 103 (name only); first described by Klatt, Leopoldina, xx. 4. — Mirador, *Liebmann*, no. 101.

+ + Heads larger: pappus tawny or rufescent: branchlets terete, striate but not winged: leaves entire.

4. M. leiostachya, Benth. Leaves large, firm in texture, ovate with acuminate apex and rounded base, pinnately 5-nerved from above the base, glabrous above, finely fuscous-pubescent on the veins beneath, at length wholly glabrate, the larger ones 3 or 4 inches in breadth: spikes 1 to 2 inches long. — Pl. Hartw. 201. — Columbia and Panama, *Seemann*, no. 446; also at Gatun Station, on the Panama Railway, *Hayes*. Said also to extend southward to Peru.

5. M. Hookeriana, DC. Leaves narrower, thinner, 3-nerved: spikes less than an inch in length: pappus rufous. — Prodr. v. 195. — Ascribed to Nicaragua and Panama by Hemsley. We have seen no specimens from any part of Mexico or Central America. The description is drawn from *Schomburgk's* no. 479 from Brit. Guiana.

§ 2. Heads not distinctly spicate nor racemose, disposed in ample terminal panicles: branchlets densely tawny-hirsute or woolly.

6. M. pyramidata, Donnell Smith. A tall climber densely covered with ferrugineous hirsute pubescence: panicle loose: heads not glomerate: leaves ovate, acuminate, rounded at the base, pinnately 5-nerved from somewhat above the base. — Bot. Gaz. xiii. 188. — Coban, Dept. Alta Verapaz, Guatemala, altitude 4,300 feet, *von Tuerckheim* (no. 1106 of Donnell Smith's sets).

7. M. eriophora, Schz. Bip. Densely tawny-tomentose, the inflorescence woolly: heads somewhat glomerate: leaves ovate, cordate, sharply acuminate, pubescent above, tomentose beneath, 5-nerved from the base, 3 to 4 inches long, 2 inches broad. — Schz. Bip. in Hemsl. l. c. (name only). — Mirador, *Liebmann*, no. 94.

§ 3. Heads disposed in roundish or flattish cymose corymbs.

* Heads rather large, when mature 4 to 5 lines in length.

+ Scales of the involucre obtuse: leaves ovate, distinctly cuneate at the base.

8. M. olivacea, Klatt. "Leaves entire." — Bull. Soc. Bot. Belg. xxxi. 195. — Forests of Buenos Ayres, Costa Rica, *Pittier*, no. 4433.

9. M. Guaco, Humb. & Bonpl. Leaves (*ex icone*) denticulate. — Pl. Æquin. ii. 84, t. 105. Said by Index Kew. to equal *M. amara*,

Willd. Spec. iii. 1744, but apparently very different from Aublet's plate of *Eupatorium parviflorum*, Pl. Guian. ii. t. 315. — Nicaragua and Panama, acc. to Hemsley.

+ + Scales of the involucre obtuse: leaves cordate-hastate at the base.

10. M. punctata, Klatt, l. c. Heads described as 7-flowered. — Clairières du Général, Costa Rica, *Pittier*, no. 3434, and banks of a stream at Buenos Ayres by same collector, no. 4934.

+ + + Scales of the involucre acute: leaves cordate or hastate, rarely subtruncate at the base.

11. M. cordifolia, Willd. l. c. 1746. *M. suaveolens*, HBK. Nov. Gen. & Spec. iv. 135. *M. gonoclada*, DC. Prodr. v. 199. *M. Fendleri*, Klatt, Abh. Naturf. Gesellsch. Halle, xv. 4 (of reprint). — W. Louisiana, *Hale;* Mexico, San Luis Potosi, *Palmer*, nos. 1079, 1115, and on rocky slopes of Tamasopa Cañon, *Pringle*, no. 3928; Colima, *Palmer*, no. 1207; Acapulco, *Palmer*, no. 565; Cordova, *Bourgeau*, no. 1812; Wartenberg, Huasteca, *Ervendberg*, no. 82; Mirador, *Sartorius;* also somewhat doubtful specimens from Guatemala, altitude 4,600 feet, *Donnell Smith*, no. 2366, and Navarro, Costa Rica, by the same collector, no. 4855.

* * Heads decidedly smaller, $2\frac{1}{2}$ to 3 lines in length.

12. M. scandens, Willd. l. c. 1743. Leaves smoothish, acuminate; hastate basal lobes little spreading. — *M. Orinocensis*, HBK. l. c. 134. *Eupatorium scandens*, L. Spec. ii. 836; Jacq. Ic. Rar. t. 169. — From N. Eng. to W. Canada, Florida, and Texas; Mexico, Victoria, Tamaulipas, *Berlandier*, nos. 852, 2272; San Blas, *W. G. Wright*, no. 1339; Cordova, *Bourgeau*, nos. 1632, 2184; Orizaba, *Botteri;* Oaxaca at Cuicatlan, *L. C. Smith*, no. 247, and near Reyes, *E. W. Nelson*, no. 1861; Guatemala, Esquintla, *Hayes*, Masagua, *Donnell Smith*, no. 2394, and Ambelice, *Heyde & Lux* (no. 3434 of Donnell Smith's sets); Nicaragua, *C. Wright;* Panama, *Seemann;* also W. India, Trop. Am., and warmer parts of the Old World.

13. M. denticulata, Willd. l. c. 1744. Leaves very scabrous, obtusish, hastate basal lobes widely spreading. — S. Mexico at Jalapa acc. to Lessing; Guiana, *Schomburgk.*

Dubious species.

M. ANGULATA, M. REPANDA, and M. TLALIXCOYAN, La Llave, El Mosaico Mexicano, ii. 299; Seemann in Hook. Jour. Bot. & Kew Misc. v. 79, from Cordova and vicinity, are unrecognized species founded solely upon foliar and very doubtful characters.

M. CORIACEA, La Llave, l. c., Seemann, l. c., is from its alternate leaves positively to be thrown out of the genus.

III. — A REVISION OF THE GENUS ZINNIA.

ZINNIA, L. (Dedicated to *Professor Johann Gottfried Zinn*, of Göttingen, born 1727, died 1759). — Heads radiate: disk-flowers hermaphrodite, fertile; ray-flowers pistillate, fertile, with suborbicular oval or oblong sessile persistent white, yellow, red, or purple ligules. Involucre ovate-cylindric or campanulate, the scales 3 – many-seriate, broad, closely imbricated, obtuse or rounded, often more or less colored and slightly inflated or subsquarrose just beneath the summit. Disk conical to columnar: chaff scarious, more or less carinate, enveloping the flowers, often erose at the mostly obtusish apex. Corollas of the disk-flowers tubular with narrow scarcely ampliate throat and 5-toothed limb. Anthers appendaged at the apex, entire at the base. Style-branches obtuse, scarcely or not at all appendaged. Achenes laterally compressed, glabrous or ciliolate on the edges, 2-toothed at the summit and frequently 1-awned from the inner angle or rarely 2-awned; the achenes of the rays triquetrous, 3-toothed, with or without 1 to 3 short or long awns. — Gen. ed. 6, no. 974; Gray, Pl. Wright. i. 105; Benth. & Hook. f. Gen. ii. 357; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 225. *Crassina*, Scepin. Diss. and *Lejica*, Hill, Exot. Bot. t. 29, *fide* Endl. *Sanvitaliopsis*, Schz. Bip. acc. to Benth. & Hook. f., l. c. — Annuals, perennial herbs, or suffrutescent plants with opposite mostly entire leaves and showy terminal pedunculate or subsessile heads. About a dozen species known in nature, and three or four others somewhat doubtfully distinguished in horticulture, beside obviously artificial varieties and hybrids. The range of the genus is from the S. United States to Chili and Brazil, but it attains its greatest specific diversity in Mexico.

§ 1. Low cespitose perennials, shrubby at the base and many-stemmed: stems (or perhaps better subsimple branches) erect, crowded, or fastigiate: root stout, ligneous: leaves strictly linear to acerose, often fascicled and rigidulous, mostly rather pale. — §§ *Diplothrix & Heterogyne*, Gray, l. c.

* Ligules showy, much exceeding the achenes, white or pale yellow.

– Leaves 1-nerved.

1. **Z. acerosa**, Gray. Leaves acerose, obscurely 1-nerved, much crowded, rather sharp-pointed but scarcely pungent. 6 to 8 or 10 lines long. — Pl. Wright. i. 106. *Diplothrix acerosa*, DC. Prodr. v. 611. — Hills of W. Texas, near Pecos, *Wright*, no. 324, *Thurber*, no. 125; Mexico, San Luis Potosi, *Berlandier*, no. 1343, *Parry & Palmer*, no. 440½; Coahuila, *Palmer*, nos. 577, 578.

2. Z. pumila, Gray. Very similar to the preceding: leaves linear, flat, mostly less than half inch long, prominently 1-nerved. — Pl. Fendl. 81, Pl. Wright. i. 105, & ii. 86. — Hills, W. Texas, *Wright*, nos. 323, 1215, to Arizona, Camp Grant, *Palmer*, no. 122, near Tucson, *Greene*, no. 1106, Camp Lowell, *Pringle*, *Lemmon*, nos. 91, 92, near Sta. Catalina, *Lemmon*, no. 3033, Lowell Mts., *W. F. Parish*; Mexico, on high plains near San Juan de la Vequeria and at "Castaniola" (= Castanuela?), *Gregg*, no. 279; on llanos of Sonora, *Schott*; east of Guadalupe Cañon, *E. K. Smith*; near Carneros Pass, Coahuila, *Pringle*, no. 2390 (distrib. as *Z. acerosa*); San Luis Potosi, *Schaffner*, no. 336, and *Parry & Palmer*, nos. 439, 440. The technical distinctions between this and the preceding are unsatisfactory at best, although the specimens are for the most part pretty readily distinguished upon the foliar differences.

+ + Leaves 3-nerved.

3. Z. juniperifolia, Gray. Leaves somewhat longer than in the related species, the larger ones inch or more in length, usually whitish beneath: rays oblong, mostly 2 or even 3 times as long as broad, of deep orange color. — Pl. Wright. i. 105. *Diplothrix juniperifolia*, DC. Prodr. v. 612. — North Mexico, mountains near San Juan de Vanegas, *Berlandier*, 1359; without locality, *Gregg*, no. 68; Santillo, *Parry*, no. 40, and near same locality, *Palmer*, no. 576; and on limestone hills, Carneros Pass, *Pringle*, no. 2404.

4. Z. grandiflora, Nutt. Leaves less than an inch in length: rays pale or sulphur yellow, very broad, suborbicular in outline. — Nutt. in Torr. & Gray, Fl. ii. 298; Torr. in Emory, Report Reconn. Calif. t. 4. — Colorado, on bluffs near Pueblo, *Greene*, to W. Texas, *Wright*, nos. 322, 1213, *Pope*, Ft. Davis, *Girard*; New Mexico, *Fendler*, no. 400, near Santa Fé, *Wislizenus*, no. 415; Arizona, near Ft. Whipple, *Coues & Palmer*, no. 2821, Ft. Apache, *Palmer*, no. 583, Mustang Mts., *Pringle*, Huerfano, *Parry*, no. 106, Upper Canadian River, *Emory*; Sonora, *Thurber*, no. 312, *Smith*; San Cedro, *Lloyd*, no. 401.

* * Ligules almost obsolete, shorter or scarcely longer than the achenes.

5. Z. anomala, Gray. Scabrous-pubescent: leaves 9 lines to inch in length, line to line and a half in breadth: heads 3 to 5 lines in diameter, appearing discoid or with evident but short yellow rays: disk-flowers apparently orange-red; the limb velvety-margined. — Pl. Wright. i. 106. — Prairies of W. Texas, *Wright*, nos. 325, 1216; near Saltillo, Coahuila, Mexico, *Palmer*, no. 581. First coll. (acc. to Gray, l. c.) by *Berlandier* in Northern Mexico.

§ 2. Erect or procumbent herbs, sometimes a little woody at the base; stems and branches loosely spreading; leaves linear, lance-linear, or elliptic-oblong: rays rather short, suborbicular or quadrate to oblong, 2 to 6 lines in length, white or sulphur yellow.

* Achenes with interrupted callous margins and somewhat tufted ciliation: slender erect annual with small heads and very pale or bright white rays.

6. Z. bicolor, Hemsl. Becoming a foot or so in height: leaves linear to lance-oblong, an inch to inch and half long, 1 to 4 lines broad, obtuse. —Biol. Cent.-Am. Bot. ii. 153, as to syn., but not as to specimens cited, except that of *Mendez*. *Z. maritima*, Gray, Proc. Am. Acad. xxii. 423, in part. *Mendezia bicolor*, DC. Prodr. v. 533; Deless. Icon. iv. t. 29. — West of Guanajuato, *Mendez;* San Luis Potosi, *Schaffner*, no. 337; Jalisco, at Tequila, *Palmer*, no. 355, and on slopes of cañons near Guadalajara, *Pringle*, no. 2313. The last two distributed as *Z. maritima*, from which this erect white-rayed plant of the inland is amply distinct.

* * Achenes evenly margined and regularly ciliated; rays yellow or orange.

7. Z. Greggii. Slender pubescent herb, becoming scabrous, erect or decumbent merely at the base: leaves linear or nearly so, 1–3-nerved, sessile: heads slender-peduncled, terminating the spreading nearly naked branches, these bearing mostly only a single pair of linear leaves: rays varying from very short-oblong to half inch in length: disk-flowers orange; ray-flowers pale yellow; ray-achenes about a line in length: disk-achenes bearing a single slender awn. — *Z. bicolor*, Hemsl. l. c. as to plants of *Coulter* and of *Seemann*, but not as to syn. *Z. maritima*, Gray, Proc. Am. Acad. xxii. 423, as to narrow-leaved form, not HBK. — Mexico, without locality, *Gregg*, 1848–1849, no. 1082; also *Baites;* W. Mexico, *Seemann;* none of these specimens show the base perfectly, but a plant apparently identical, collected by *F. H. Lamb* on plains at Zopelote, Tepic, 9 February, 1895, no. 555, has a thickish perennial root.

8. Z. littoralis. Procumbent spreading herb, probably of biennial or perennial duration: stems leafy, branched, striate, puberulent: leaves elliptic-oblong or elliptic-lanceolate, obtuse or obtusish at both ends, 3 (or obscurely 5)-nerved and reticulated, green on both sides, 4 to 10 lines long, a third to half as broad: heads scarcely peduncled, borne at the ends of leafy branches: rays orbicular or nearly so, pale yellow, striate and greenish toward the ends beneath: disk-flowers bright orange-colored; chaff oblong, very obtuse or truncate: achenes with a very narrow cartilaginous margin, ciliated: pappus of a single awn with or without a shorter second one: achenes of the ray-flowers about 1½ lines long, tuberculate. — Collected at Mazatlan by *Th. Coulter*, and redis-

covered on dry hills of the coast at the same point by *W. G. Wright*, January, 1889, no. 1201 (distributed as *Z. maritima?*); also by *F. H. Lamb* on dry rocky cliffs at same place, 26 Decemher, 1894, no. 325 (distributed as *Z. maritima*). In the presence of good material of all three species we cannot doubt the complete distinctness of this species from the preceding and from the following.

§ 3. Herbs with ovate or elliptic-oblong leaves: heads strongly bicolorous; disk dark purple-brown, nearly black; rays oblong, bright yellow.

9. Z. maritima, HBK. Prostrate, much branched from the base: stems spreading: leaves elliptic or elliptic-oblong, obtuse at the apex, rather abruptly contracted to short but distinct pubescent petioles: heads 8 to 10 lines in diameter (incl. rays), terminal, mostly borne on long naked peduncles: chaff narrowed above although obtusish at the dark-colored point; achenes of the disk-flowers strongly callous-margined: rays oblong, golden yellow; ray-achenes 1½ to 2 lines long. — Nov. Gen. & Spec. iv. 251, not Gray, l. c. — Acapulco, *Humboldt & Bonpland;* rediscovered at the same point by *Palmer*, February, 1895, no. 523. From its peduncled heads, oblong rays, callous-margined achenes, etc., we cannot doubt that Dr. Palmer's plant represents the real *Z. maritima* which came from the same locality so long ago. Yet Palmer's plant has leaves considerably larger than those described by Kunth.

10. Z. Palmeri, Gray. Erect branched annual, a foot or so in height: leaves ovate, or lanceolate from an ovate cordate or subcordate closely sessile base, acute or acuminate at the apex. — Proc. Am. Acad. xxii. 423. — Jalisco, at Tequila, *Palmer*, no. 386, *Pringle*, no. 4557; also at Manzanillo, *Palmer*, no. 893, and Colima, *Palmer*, no. 893 a.

§ 4. Erect perennials with spreading branches and narrow linear or oblong leaves: rays oblong, 4 to 12 lines in length, deep orange-colored as well as the disk-flowers.

11. Z. linearis, Benth. Much branched, 8 inches to a foot or two in height: heads many and very showy, of intense orange color (persisting even in old dried specimens): leaves linear or nearly so. — Pl. Hartw. 17. — Aguas Calientes, *Hartweg*, no. 117; San Luis Potosi, near Morales, *Schaffner*, no. 210, and in same state by *Parry & Palmer*, no. 441; Jalisco, on the Rio Blanco, *Palmer*, no. 54, and on hills near Guadalajara, *Pringle*, no. 1778.

Var. latifolia, Rose. Leaves somewhat broader, oblong. — Contrib. U. S. Nat. Herb. i. 102. — Alamos, *Palmer*, no. 352.

§ 5. Distinctly annual herb with showy flowers: disk and rays concolorous, yellow, red, or purple, or if discolorous the disk-flowers yellow or greenish and the rays red or purple: leaves ovate, lanceolate, or elliptic.

* Leaves sessile or nearly so, entire.

+ Achenes of the disk-flowers short and broad, obovate, 2 to $2\frac{1}{2}$ lines in length: stems hirsute with spreading hairs.

12. Z. angustifolia, HBK. Branching, $1\frac{1}{2}$ to 2 feet high: leaves lance-linear from a sessile ovate base: disk very convex, orange-yellow from the abundant acute exserted chaff (orange-yellow minutely tipped with purple at the very summit); disk-flowers at first orange and becoming darker with age: rays paler yellow. — Nov. Gen. & Spec. iv. 251; DC. Prodr. v. 536. — Originally collected in the neighborhood of Guanajuato by *Humboldt & Bompland*, and described as having leaves "scarcely 2 lines broad." Our only authentic specimen of this species is one of *Mendez* sent by De Candolle to Dr. Gray and mentioned in the Prodromus as of this species. From other details of the description we cannot doubt that De Candolle was right in referring this plant to Kunth's species, although in it and in all the following specimens attributed to this species the leaves are considerably broader than originally described, varying from 3 to 8 lines in breadth. Evidently identical with Mendez' plant are specimens collected at Morelia, *Ghiesbreght*; no. 369 (?*Z. Ghiesbreghtii*, Verlot. Rev. Hort. 1862, 368; Vilmorin, Fl. Pl. Terre, 971, = *Z. Mexicana*, Hort. *fide* Vilmorin, l. c.), and near La Barca, Jalisco, *Pringle*, no. 3866; also cultivated plants from the Harvard Botanic Garden, dated 1861 and 1865. From this species, notwithstanding its still broader leaves, we cannot confidently separate the horticultural *Z. Haageana*, Regel, Gartenfl. x. 355, *ex char.*

13. Z. elegans, Jacq. Erect: stems less branched: leaves broader, ovate or elliptic, closely sessile and clasping, inch or so in breadth: disk-flowers yellow or orange, scarcely or not at all exceeded by the purplish tipped chaff; rays numerous, purple or lilac. — Coll. & Icon. Pl. Rar. iii. t. 589; Sims, Bot. Mag. t. 527. — South Mexico, Ziticuaro, *Hartweg*; mountains of Tixtla near Cuernavaca, *Berlandier*, no. 975; also without locality, *Ghiesbreght*, no. 306. Extensively cultivated in various countries.

+ + Achenes longer, narrower, oblong, 3 or 4 lines in length.

++ Hirsute with spreading hairs: rays rather broad, patulous, yellow as well as the disk.

14. Z. pauciflora, L. Erect roughish-pubescent annual, somewhat corymbosely branched above: peduncles at maturity enlarged upwards and fistulous: the yellow heads about an inch in diameter. — Spec. ed. 3, 1269; Lam. Ill. t. 685, f. 1; DC. Prodr. v. 535. *Z. lutea*, Gærtn. Frucht. ii. 459, t. 172. — Chiapas, Mexico, *Nelson*, no. 3074; Andes of Peru, *Mathews*, no. 456, and Bolivia, *Mandon*, no. 38; also St. Thomas, W. I., *Eggers*, no. 400. Introduced in W. Africa at Cape Verd.

++ ++ Pubescence of the stem much finer, appressed or very rarely spreading: rays red or purple, mostly narrow and suberect or scarcely spreading.

15. Z. multiflora, L. l. c. Erect annual with habit of the preceding, or subsimple: leaves ovate and acute or ovate-oblong and obtusish: peduncles (frequently short or none) often thickened upwards. — L. f. Dec. Ups. 23, t. 12; Curtis, Bot. Mag. t. 149. *Z. tenuiflora*, Jacq. Icon. Pl. Rar. iii. 590. *Z. leptopoda*, DC. Prodr. v. 535 (merely weak form or state with more slender peduncles). *Z. Floridana*, Raf. New Fl. iv. 70. *Z. intermedia*, Engelm. in Wisliz. Tour N. Mex. 107. *Z. Mendocino*, Philippi, Sert. Mendoc. Alt. 27, *fide* Baker, Fl. Bras. vi. pt. 3, 178. — The commonest and most widely distributed species extending from Florida, *Chapman*, *Curtiss*, no. 1417, to Texas, *Drummond*, no. 115, *Lindheimer*, no. 93 (but in these localities probably introduced; see Gray, Syn. Fl. i. pt. 2, 253); S. Arizona near Ft. Huachuca, *Lemmon*, no. 2761; throughout Mexico, Sonora, *Wright*, no. 1213, *Thurber*, no. 920, *Schott*, *Hartman*, no. 104; Chihuahua, *Thurber*, no. 832, *Schott*. *Wislizenus*, *Palmer*, nos. 115, 156, *Pringle*, no. 316; Coahuila, *Palmer*, nos. 574, 575; San Luis Potosi, *Parry & Palmer*, no. 438; Orizaba, *Bourgeau*, no. 1682, *Botteri*, nos. 73, 516, 940, *Seaton*, no. 345; Cordova, *Bourgeau*, no. 1633; Guadalupe, *Bourgeau*, no. 500; Oaxaca, *Andrieux*, no. 314, *L. C. Smith*, nos. 813, 957; Chiapas, *Ghiesbreght*, no. 126; Guatemala, *Heyde & Lux* (no. 3808 of Donnell Smith's sets); Venezuela, *Fendler*, no. 1974; Bolivian Andes, *Mandon*, nos. 39, 40, and *Bang*, no. 207.

The yellow-rayed specimens, referred by various authors to this species, have in most instances, if not always, the pubescence of *Z. pauciflora*, to which it seems best to refer them.

* * Leaves elliptic, petiolate, dentate.

Z. Liebmannii, Benth. & Hook. f. Leaves squamulose-hirsute above, ferrugineous beneath: peduncles quadrangular-sulcate: chaff

aculeate or uncinate. — Benth. & Hook. f. acc. to Klatt, Leopoldina, xxiii. 2, where first described. — Mexico on the Rio Taba, *Liebmann*, no. 552.

Doubtful species known chiefly or exclusively from cultivated specimens.

Z. Rœzlii, Hort. Gard. Chron. 1872, page 1392; Hook. f. & Jackson, Ind. Kew. ii. 1251, is a mere horticultural name for a yellow-flowered annual species said to come from Mexico, but never properly described.

Z. verticillata, Andrews, Bot. Rep. iii. t. 189, is apparently only a robust cultivated form of *Z. multiflora*, with verticillate leaves, and double series of rays: said also to come from S. Mexico.

Z. hybrida, Römer & Usteri, Mag. Bot. St. 1 (1787), 49; Curtis, Bot. Mag. t. 2123 (*Z. grandiflora*, Hort. *fide* DC. Prodr. v. 536, not Nutt.), is an annual with deep red rays, greenish disk, and chaff not fringed at the apex: apparently only a form of *Z. multiflora*, with rays becoming broad and somewhat double by cultivation.

Z. ambigua, Salm-Dyck, and Z. discolor, Hort., are names only, and wholly obscure.

IV. — REVISION OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF THE GENUS CALEA.

CALEA, L., R. Br. (Name of obscure origin. The derivation from καλός, beautiful, is unsatisfactory, and at best very doubtful.) — Heads mostly small or of medium size, radiate or discoid. Involucre ovoid, cylindrical, or campanulate; its scales pluriseriate, imbricated, usually very unequal, the outer gradually shorter, all scarious or the outer (rarely all) herbaceous or herbaceous-tipped. Receptacle small, convex, or flattish, paleaceous: chaff scarious, concave, rigid or thin and hyaline. Ray-flowers when present fertile; ligules yellow, white, or roseate, entire or denticulate at the apex. Disk-flowers fertile, yellow or white; the limb of the corolla regular, deeply 5-cleft. Authers appendaged at the apex and shortly sagittate-lobed at the base. Style-branches subtruncate or with a very short appendage. Achenes slender, subterete or more or less distinctly 4–5-angled, usually pubescent: pappus of 4 to 20 subequal scales; these mostly fringed or ciliolate, rarely wanting, when numerous narrow and acuminate or when fewer usually short and blunt. — About 85 species of shrubs and perennial herbs (rarely climbers), extending from Mexico to Tropical S. America. Leaves opposite, simple, mostly ovate, oblong, or lanceolate, sessile or petiolate, mostly

serrate or dentate, rarely entire (in one or more S. American species pinnatifid). The limits of the genus here taken are essentially those of Bentham & Hooker (Gen. ii. 390), and Hoffmann (in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 246), whose generic synonymy need not here be repeated. The Mexican and Central American species may be subdivided according to the following characters.

Subgenus 1. LEONTOPHTHALMUM, Benth. & Hook. f. Heads very large (inch or more in diameter), radiate, few or solitary, long-peduncled: scales of the involucre few-seriate, broad, the outer often herbaceous: both disk- and ray-flowers yellow: scales of the pappus numerous. — Gen. ii. 391. *Leontophthalmum*, Willd. Gesellsch. Natur. Fr. Berl. Mag. 1807, 40; HBK. Nov. Gen. & Spec. iv. t. 409. — Mostly S. American species, only the following known from Mexico.

1. C. megacephala. Erect, herbaceous, 2 or 3 feet high: stem striate-angulate, hirsute-pubescent, leafy to the middle and terminating in one or (more rarely) three long naked 1-headed peduncles (often 18 inches in length): leaves thin, ample, hirsute upon both sides, rhombic-ovate or with deltoid acute or obtusish coarsely dentate blade (3 to 4 inches long, nearly as broad) abruptly contracted at the base, then gradually attenuate into a winged entire petiole of nearly equal length; the lowermost leaves smaller, obovate, and with rounded apex: heads, exclusive of rays, 9 to 12 lines in diameter: flowers deep orange; ray-flowers 15 to 20, with oblong spreading ligules half inch in length: disk conical. — Collected by *E. W. Nelson* at Sta. Efigenia, Oaxaca, altitude 500 feet, 18 July, 1895, no. 2844, and on top of ridge back of Tonala, Chiapas, altitude 1,200 to 2,500 feet, 10 August, 1895, no. 2884. A plant without close affinities in the Mexican species of the genus, but related to several of the S. American.

Subgenus 2. OTEIZA, Llav. (as gen.). Heads few or solitary, large, 9 to 15 lines in diameter, loosely cymose or (in *C. elegans*) somewhat densely grouped at the ends of the branches: rays long (nearly or quite half inch in length) white or roseate: leaves sessile or nearly so.

* Leaves oblong, narrowed at the base.

2. C. Palmeri, Gray. Herbaceous, erect or slightly decumbent: stem simple or divided almost from the base, pubescent, 18 inches to 2 feet high: leaves 2 to 3 inches long, 4 to 6 lines broad, denticulate and ciliated, 3-nerved: heads 1 to 9, in terminal loose cymes; slender peduncles nearly naked; the floral leaves short and linear: involucral bracts green, few-seriate and more nearly equal than is usual in the genus. — Proc. Am. Acad. xxii. 430. — On the Rio Blanco, Jalisco, *Palmer*, no.

147; on slopes of a barranca near Guadalajara, *Pringle*, no. 2904; and Michoacan, on grassy hills near Patzcuaro, *Pringle*, no. 4125; fl. July.

* * Leaves ovate, abrupt or cordate at the sessile or subsessile base.

3. C. elegans, DC. Leaves thickish, quite glabrous above, finely pubescent upon the veins beneath, ovate to ovate-lanceolate, few-toothed, long-acuminate, considerably paler beneath: heads loosely or somewhat closely cymose at the ends of the branches: rays about 8 or 10. — Prodr. v. 674. *Oteiza acuminata*, Llav. Reg. Trim. Mex. 1832, 41. — Valley of San Luis Potosi, *Schaffner*, no. 237, and *Parry & Palmer*, no. 491; and in Tultenango Cañon, State of Mexico, *Pringle*, no. 4297, with heads more aggregated; fl. August till last of October. An imperfect specimen collected by *Baites*, 1846, in Mexico, without more precise locality, is probably of this species.

4. C. multiradiata, Seaton. Herbaceous, erect or decumbent, with habit of the preceding but with sessile leaves thinner, less attenuate, appressed-pubescent upon both surfaces and scarcely paler beneath: heads on very long peduncles, 3 or 4 in number: rays 15 to 20. — Proc. Am. Acad. xxviii. 120. — Wooded slopes of Mt. Orizaba, altitude 10,000 feet, *Seaton*, no. 167, in part. In flower in August. With the type material of this species in the Gray Herbarium were associated specimens of a *Sabazia* and *Tridax* of similar habit.

5. C. sabazioides, Hemsl. "Slender herb, 1 to 1½ feet high, procumbent, rooting at the base, in habit very similar to *Sabazia sarmentosa:* leaves decussate, ovate, petiolate, acute, crenate, 3-nerved, hirsute: heads solitary, radiate, as large as in *Tridax:* bractioles [chaff] scarious, uninerviate, pale fuscous, oblong-ovate, 2-dentate beneath the gradually and narrowly acuminate summit: rays purplish white." — Biol. Cent.-Am. Bot. ii. 206. *Allocarpus sabazioides*, Less. Linnæa, ix. 590. — Near San Miguel del Soldado and La Joya, S. Mexico. No specimens exactly agreeing with this description have been seen by the writers, and the characters are here translated from the Latin of Lessing.

Subgenus 3. Eucalea, Benth. & Hook. f. (extended). Heads relatively small and numerous, in close corymbs or somewhat umbellate: rays short or none: scales of the pappus 7 to 20: leaves sessile or short-petioled, serrate or dentate (in one species subentire). — Gen. ii. 391.

* Inflorescences terminal, close, on long naked peduncles: upper leaves reduced to small oblong or linear bracts: heads homogamous: pappus often reduced or wholly wanting. — *Calydermos*, Lag.

+ Scales of the involucre densely fringed with yellowish glandular-tipped hairs.

6. C. thysanolepis. Slender erect herb, 18 inches to 2 feet high: stem simple, striate, densely pubescent, prolonged at the summit into a

nearly naked peduncle bearing a dense cymose cluster of heads: leaves ovate, acute, subcordate at the base, sharply dentate, roughish-pubescent upon both surfaces, 3–5-nerved and coarsely reticulate-veined, 1 to 3 inches long, a third or half as broad, scarcely paler beneath, closely sessile: inflorescence and especially the margins of the 3-seriate involucral scales densely glandular-pubescent: heads about 18-flowered: chaff irregularly erose, often constricted below the summit: achenes calvous, terete: corolla pubescent. — Collected by *E. W. Nelson* on the summit of the Sierra Madre near Chilpancingo, Guerrero, altitude 9,000 to 10,200 feet, in flower 24 December, 1894.

+ + Scales of the involucre essentially glabrous.

7. C. peduncularis, HBK. Erect or decumbent, 1 to 2 feet high, pubescent and usually more or less scabrous: leaves ovate, closely sessile by a broad abrupt or subcordate base, dentate, 1½ to 3 inches long, nearly half as broad: scales of the involucre yellow: pappus present, about two thirds the length of the achenes. — Nov. Gen. & Spec. iv. 295, t. 408. *Calydermos peduncularis*, DC. Prodr. v. 669. *C. scaber*, Lag. Nov. Gen. 25. *Calebrachys peduncularis*, Cass. Dict. Sci. Nat. lv. 277. — South Mexico, Mt. Jorullo, at 3,000 feet, *Humboldt & Bonpland*; Mirador, *Sartorius*; Chiapas, *Ghiesbreght*, no. 783, and *E. W. Nelson*, no. 3261; mountains near Guapimalpatt, Mexico, *Schaffner*, no. 35; Chinantla, *Liebmann*, no. 413; Boerego near Orizaba, *Bourgeau*, no. 3149; Mt. Orizaba, altitude 4,000 feet, *Seaton*, no. 126, and altitude 10,000 feet by same collector, no. 168; also in Orizaba, *Hahn*, no. 2692, *Bilimek*, no. 544, and *Botteri*, nos. 620, 803; Jalapa, *Th. Coulter*, no. 334, in part.

Var. epapposa, HBK. Closely similar in foliage and habit: achenes wholly destitute of pappus. — HBK. *fide* DC. Prodr. v. 669. — Near Santa Rosa, acc. to HBK. l. c.; also San Luis Potosi, *Parry & Palmer*, no. 497; Las Canoas in the same state, *Pringle*, no. 3672; Valley of Mexico near the Santa Fé, *Bourgeau*, no. 718; Jalapa, *Th. Coulter*, no. 334, in part, and near Reyes, Oaxaca, altitude 6,700 to 10,000 feet, *E. W. Nelson*; also Mexico without locality, *Th. Coulter*, no. 250, in part (the other part of the same number being a *Eupatorium*); fl. August to October.

Var. longifolia, (Lag.) Gray. Leaves lanceolate or lance-oblong, opposite or ternate, relatively much narrower and more elongated; the lower 3 to 6 inches long: scales of the involucre yellow: pappus none. — Proc. Am. Acad. xxii. 430, as to syn. *Calydermos longifolius*, Lag. and Pl. Hartw. *Calydermos scaber*, var. Benth. Pl. Hartw. 346. — Bolaños, *Hartweg*, no. 122, at least as to long-leaved specimens.

Var. livida. Leaves narrow, lanceolate to lance-oblong, very scabrous-pubescent: involucral scales dark purple: pappus present. — *C. peduncularis*, var. *longifolia*, Gray, as to pl. Palmer. — On the Rio Blanco, Jalisco, *Palmer*, no. 317; and in damp shady cañons near Guadalajara, *Pringle*, no. 2326; fl. August to October.

8. C. Liebmannii, Schz. Bip. Branches terete: leaves petiolate, ovate-elliptic, 2 inches long, 9 lines broad, coriaceous, 3-nerved, glabrous above, ferrugineous and chrysopunctate beneath: heads short-pedicelled, 6-flowered, disposed at the summits of the peduncles in umbelliform corymbs: involucres cylindraceous: scales 3-seriate, ovate, subreflexed at the apex: chaff membranaceous, ovate, acute: achenes glabrous; scales of the pappus 10, short. — Leopoldina, xxiii. 6. — Gualulu, *Liebmann*, no. 411. Not seen by the writers, and doubtfully referred to this subdivision. The characters are drawn from the original description of Klatt.

* * Inflorescences more numerous, short-peduncled or sessile, together forming leafy panicles.

\+ Pappus-scales rather few, ovate to lanceolate, shorter than the achenes.

\+ + Inflorescences lax, somewhat umbelliform: pedicels slender and relatively long, most of them considerably exceeding the heads in length.

9. C. salmeæfolia, Hemsl. l. c. Shrub, 2 to 3 feet high, with rhombic-ovate leaves acute at both ends, smoothish and lucid above, 1 to 1½ inches long, half as broad: heads 8–14-flowered. — *Calydermos salmeæfolius*, DC. Prodr. v. 670. — Between Tula and Tampico, Tamaulipas, *Berlandier*, nos. 718, 2135.

\+ + Inflorescence denser: pedicels mostly very short, seldom equalling or exceeding the heads (except in *C. Zacatechichi*, var. *macrophylla*).

= Involucre of most or all of the heads closely subtended by a few broad obtuse herbaceous bractlets.

10. C. albida, Gray. A branching pubescent shrub: leaves ovate, shortly petiolate, serrate, acutish at the apex, abruptly contracted at the broad obtuse base, scabrous above, somewhat paler and moderately pubescent below, 1 to 1½ inches long, two thirds as broad: heads numerous, cymosely clustered at the ends of the leafy branches, on pedicels 1 to 9 lines in length, homogamous or with one or more reduced ray-flowers; flowers whitish: achenes pubescent, scales of the pappus acute. — Proc. Am. Acad. xv. 38. — San Luis Potosi, in mountains near Morales, *Schaffner*, no. 269, and later in the same state, *Parry & Palmer*, no. 448; in fl. in August.

11. C. hypoleuca. Similar in habit: leaves somewhat larger, broadly ovate or suborbicular, sessile or very shortly petioled, scabrous

above, densely tomentose and canescent beneath, 1½ to 2 inches in diameter: heads very short-pedicelled or subsessile: scales of the pappus obtuse or rounded at the summit. — Oaxaca, Sierra de San Felipe, altitude 6,000 feet, 7 September, 1894, *Pringle*, no. 5784; dry hills in the Valley of Oaxaca, altitude 5,100 to 5,800 feet, 8 September, 1894, *E. W. Nelson*, no. 1217, and in neighboring locality without date, *Nelson*, no. 1192; also in Valley of Etla, September, 1895, *Alvarez*, (L. C. Smith's) no. 766.

= = Involucre nearly or quite naked, without subtending herbaceous bractlets, or these small and scattered, lanceolate or subulate.

a. Leaves wholly glabrous, quite smooth and free from resinous dots or globules.

12. C. Nelsonii. Glabrous, copiously branched and very leafy: leaves rhombic-ovate, coarsely and rather bluntly toothed, 3-nerved, short-petioled, paler beneath, quite smooth but scarcely or not at all lucid upon both sides, 1½ to 2 inches long, half as broad: heads very numerous in many terminal or subterminal close cymes, together forming a considerable pyramidal inflorescence: involucral bracts light colored, striated, obtuse: disk-flowers about 7; ray-flowers 2 or 3, with very short obscure ligules: pappus of about 12 scales. — Collected by *E. W. Nelson* on the top of ridge back of Tonala, Chiapas, altitude 1,200 to 2,500 feet, 10 August, 1895, no. 2887.

b. Leaves pubescent, or at least covered on the lower surface with resinous atoms.

13. C. Zacatechichi, Schlecht. Much branched shrub with harsh scabrous foliage: leaves rhombic-ovate to ovate-oblong, short-petioled, described as deeply crenate, but more often serrate-dentate, acute, cuneate at the base: heads about 12-flowered, very short-pedicelled or sessile in numerous small terminal cymes: scales of the involucre with scarious and undulate margins. — Linnæa, ix. 589; DC. Prodr. v. 672; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 246, f. 120, A–C. — On hills near Hacienda de la Laguna and Jalapa, *Schiede;* Mirador, *Sartorius;* Orizaba, *Botteri*, nos. 481, 488; San Pedro Sula, Dept. Sta. Barbara, Honduras, *Thieme* (no. 5300 of Donnell Smith's sets, a form approaching var. *macrophylla*), and Guanagaza, Dept. Sta. Rosa, Guatemala, *Heyde & Lux* (no. 6159 of same sets). The leaves are reputed a remedy for cholera. A form probably of the same species, but having the involucral bracts less scarious-undulate and more often ciliolate, has been collected on hills near Guadalajara, by *Palmer*, no. 352, and *Pringle*, no. 2475. Another form collected by *Pringle* in the Sierra Madre near Monterey, Nuevo Leon, no. 2224, differs only in

having the involucre calyculate with 1 to 3 lanceolate herbaceous-tipped bractlets.

Var. rugosa. Habit, foliage, and inflorescence of the preceding species: heads smaller, 5–10-flowered. — *C. rugosa*, Hemsl. Biol. Cent.-Am. Bot. ii. 206. *Calydermos rugosus*, DC. Prodr. v. 670. — Cuernavaca, Morelos, *Berlandier*, no. 1061; also in Orizaba, *Bourgeau*, no. 3095; near Acapulco, *Palmer*, no. 52.

Var. macrophylla. Leaves mostly much larger, $2\frac{1}{2}$ to 3 inches or more in length, half as broad, less rugose: pedicels often equalling or considerably exceeding the 12-flowered heads: achenes nearly $1\frac{1}{2}$ lines in length, the pappus only a third as long. — Collected by *H. von Tuerckheim* at Coban, Dept. Alta Verapaz, altitude 4,300 feet, February, 1888, and distributed as *C. Zacatechichi* in Donnell Smith's Guatemalan sets, no. 1345; also by *Heyde & Lux*, at Laguna de Ayarza, Dept. Jalapa, altitude 8,000 feet, distributed in same set as *C. salmeæfolia*, no. 3782.

+ + Scales of the pappus narrower, more numerous, equalling or exceeding the achenes.

++ Involucre cylindrical, or narrowly campanulate, rather few-flowered; scales broad, scarious, glabrous or only the outermost herbaceous and somewhat pubescent: pedicels less than an inch in length: plants pubescent.

= Heads numerous, radiate, with ligules evident.

a. Inflorescences terminal, cymose-paniculate or somewhat corymbose: heads very numerous, small: involucre ecalyculate.

14. C. integrifolia, Hemsl. Shrub, 4 to 8 feet high: leaves ovate-lanceolate, attenuate at the apex, rounded or obtusish at the short-petioled base, cuspidate-denticulate, varying from papillose-pubescent and very scabrous to smoothish and lucid, 2 to $4\frac{1}{2}$ inches long, a third to half as broad; the veins very prominent beneath: heads 15–20-flowered: disk-flowers yellow; ray-flowers 5, white, destitute of pappus. — Biol. Centr.-Am. Bot. ii. 205. *Allocarpus integrifolius*, DC. Prodr. v. 676. — Originally collected in Mexico without more exact locality by *Karwinski*; later in Mirador by *Sartorius*, by *Liebmann*, no. 418, and by *E. W. Nelson*, no. 86; Chiapas, *Ghiesbreght*, no. 565; Cordova, *Bourgeau*, no. 1751, and *A. Gray*; near Orizaba, altitude 4,000 feet, *Pringle*, no. 5915, and *E. W. Nelson*, no. 2; Oaxaca, on the Sierra de San Felipe, altitude 8,000 feet, *Pringle*, no. 6111; Cieneguilla, *L. C. Smith*, no. 381; between Panixtlahuaca and Jaquila, altitude 1,000 to 5,000 feet, *E. W. Nelson*, no. 2389; City of Mexico, *Mrs. D. H. Sheldon*; Guatemala, at Coban, Dept. Alta Verapaz, altitude 4,300 feet, *von Tuerckheim* (no. 379 of Donnell Smith's sets); Guarda Viejo, Dept. of Guatemala, altitude

5,000 feet, *Donnell Smith*, no. 2345; Teocinte, Dept. Sta. Barbara, altitude 2,500 feet, *Heyde & Lux* (no. 4199 of Donnell Smith's sets); San Rafael, Dept. Zacatepequez, altitude 6,500 feet, *Donnell Smith*, no. 2332. One of the commonest species of S. Mexico and Central America.

Var. dentata, Coulter. Leaves with more pronounced dentation, long caudate-acuminate: the floral oblong-linear, attenuate. — Bot. Gaz. xx. 51. — Nebaj, Dept. Quiche, Guatemala, altitude 7,000 feet, *Heyde & Lux* (no. 4506 of Donnell Smith's sets). Hither we would refer *Nelson's* no. 2513, collected between Suchiotepec and Miahuatlan, Oaxaca.

b. Inflorescences cymose-umbellate in the upper axils, together forming a leafy elongated or thyrsoid panicle: involucre commonly calyculate with one or more herbaceous bractlets.

15. C. axillaris, DC. Shrub: leaves ovate-lanceolate or ovate-oblong, attenuate-acuminate, sharply serrate. — Prodr. v. 673. *Mocinna serrata*, Lag. Nov. Gen. 31. — Mexico, *Hænke;* Valley of Cordova, *Bourgeau*, no. 1675; between San Luis Potosi and Tampico, *Palmer*, no. 1111. Passes into

Var. urticæfolia. Leaves shorter and relatively broader, ovate, acute or acutish to barely acuminate, crenate-serrate. — *Caleacte urticifolia*, R. Br. Trans. Linn. Soc. xii. 109. *Calea urticæfolia*, DC. l. c. 674. — The commoner form, Mexico without locality, *Gregg*, nos. 1002, 1042; Orizaba, *Schaffner*, and *A. Gray;* Wartenberg near Tantoyuca, Huasteca, *Ervendberg*, no. 96 (passing to typical form); Colima, *Palmer*, no. 1215; Jalisco, on rocky slopes near Guadalajara, *Pringle*, no. 1788; and in neighboring locality on Rio Blanco, *Palmer*, no. 675 (robust form with ternate leaves); Guatemala on the Rio Amatitlan, altitude 3,900 feet, *Donnell Smith*, no. 2337, also Jumaytepeque, Dept. Santa Rosa, altitude 6,000 feet, *Heyde & Lux* (no. 3790 of Donnell Smith's sets); Costa Rica at Navarro, altitude 3,500 feet, *Donnell Smith*, no. 4857; Nicaragua, *Wright*.

= = Heads subumbellate at the ends of the branches or from the upper axils, discoid: Chiapas and southward.

16. C. prunifolia, HBK. Shrub: leaves broadly elliptic-ovate, crenate, obtuse, abruptly contracted to a subcuneate base, slender-petioled, scabrous and rugose above, somewhat paler and scabrous beneath, 2 to $3\frac{1}{2}$ inches long, two thirds as broad: heads about 18-flowered. — Nov. Gen. & Spec. iv. 294, t. 406. — A South American species reaching the Isthmus of Panama, where collected by *Seemann* and later by *Hayes*.

17. C. trichotoma, Donnell Smith. Densely fuscous-tomentose: leaves ovate, acutish, crenate-serrate, scabrous above, somewhat canescent-tomentose beneath, 1 to $2\frac{1}{4}$ inches long, one half to two thirds as broad; stems somewhat tortuous as though scandent. — Bot. Gaz. xiii. 299. — Rocky mountain sides near Coban, Dept. Alta Verapaz, altitude 4,300 feet, *von Tuerckheim* (no. 1353 of Donnell Smith's sets); Chiapas, table land about Ocuilapa, altitude 3,400 to 3,800 feet, *E. W. Nelson*, no. 3004.

↔ ↔ Heads campanulate, many-flowered: scales of the involucre glabrous: leaves very large ($2\frac{1}{2}$ inches or more in breadth): pedicels less than an inch in length: Costa Rican species.

18. C. pellucidinervia, Klatt. Leaves membranaceous, broadly ovate, 4 inches long, two thirds as broad, long-acuminate, serrate-dentate, rounded at the base; petiole 5 lines long, densely pilose: ligules 6, 2 lines in length. — Bull. Soc. Bot. Belg. xxxi. 207. — In woods at Terraba, altitude 900 feet, *Pittier*, nos. 3707, 3726. A species not seen by the writers; the description is condensed from the original characterization.

↔ ↔ ↔ Heads campanulate, many-flowered: scales of the involucre multiseriate, sub-herbaceous, very pubescent: pedicles half inch or less in length: leaves smaller: Mexican species.

19. C. scabrifolia, Benth. & Hook. f. Shrub: leaves ovate-oblong or oblong-lanceolate, attenuate, serrate or serrulate, thickish above papillose-pubescent and very scabrous, below sparingly pubescent, slightly paler and with veins very prominent: pedicels and involucral bracts densely canescent-tomentose: disk-flowers 125 or more; ray-flowers 20 to 25, the latter without pappus: plant drying green. — Benth. & Hook. f. acc. to Hemsl. Biol. Centr.-Am. Bot. ii. 206. *Allocarpus scabrifolius*, Hook. & Arn. Bot. Beech. 300. *Ferdinanda oppositifolia*, Schz. Bip. in Seemann, Bot. Herald (by error cited as *Zaluzania* by Benth. & Hook. f. Gen. ii. 391). *Perymenium album*, Wats. Proc. Am. Acad. xxv. 154. — N. W. Mexico in Sierra Madre, *Seemann*; Jalisco, on mountains near Lake Chapala, *Pringle*, no. 2438, in fl. December; Alamos, *Palmer*, no. 283.

20. C. submembranacea, Fernald. Similar in habit: leaves thinner, nearly smooth and somewhat lucid, somewhat nigrescent in drying. — Bot. Gaz. xx. 535. — On mountain sides, Zopelote, Tepic, altitude 3,000 feet, *Lamb*, no. 554.

↔ ↔ ↔ ↔ Heads few; campanulate: scales of the involucre broad, few-seriate, glabrous: pedicels very long ($1\frac{1}{2}$ to 2 inches): plant essentially glabrous.

21. C. longipedicellata. Shrub, glabrous throughout except the puberulent summits of the long pedicels: leaves elliptical, acutish at both

ends, callous-denticulate, short-petioled, paler beneath, 3-nerved, 1½ to 2 inches long, 9 or 10 lines broad: heads 2 to 4 at the ends of the branches (springing from the opposite axils of the last pair or two pairs of leaves), half inch in diameter, homogamous: outer involucral scales scarcely shorter than the inner, broadly oblong, rounded at the apex: scales of the pappus linear-attenuate, about 20 in number: achenes glabrous. — Collected by *E. W. Nelson*, near Choapam, altitude 3,800 to 4,500 feet, 28, 29 July, 1894, no. 898.

+ + + Doubtful and poorly characterized species, probably referable to this subdivision and very likely synonymous with some of the foregoing species.

22. C. cacosmioides, Less. "Bracteoles [by which is meant apparently the *chaff*] broad, at the apex laciniate, acuminate and aristate: involucres cylindrical, about 12-flowered: differing from *C. solidaginia*, Kunth, not only in the form of the bracteoles, but also in the radiate heads, and in the leaves obtuse at the base or acute but not acuminate into petioles, sharply serrate, subglabrous, lucid above." — Linnæa, v. 157. — In open places near Jalapa, October, *Schiede & Deppe*. The characters translated from the original Latin description.

23. C. brachiata, DC. "Shrub: branches brachiate: leaves ovate, obtusely mucronate: heads fasciculate and mostly terminal." — Prodr. v. 673 (whence descr.). *Mocinna brachiata*, Lag. Nov. Gen. 31. *Galinsogea brachiata*, Spreng. Syst. iii. 579. — "In Panamaide" acc. to Lagasca, l. c.

Subgenus 4. TETRACHYRON, Benth. & Hook. f. Heads corymbose, radiate: leaves oblong or lanceolate, often with interpetiolar dilation: both disk- and ray-flowers yellow: scales of the pappus only 4. — Gen. ii. 391. *Tetrachyron*, Schlecht. Linnæa, xix. 744.

24. C. manicata, Benth. & Hook. f., l. c. A tall glabrous shrub, 8 to 12 feet in height: leaves lanceolate, gradually narrowed at both ends, serrate, 4 or 5 inches long, 9 lines broad, nigrescent in drying: involucres somewhat turbinate-campanulate, ecalyculate: corymbs flat, 2 to 6 inches or more in diameter: rays about 12: scales of the pappus a third to half as long as the achene. — Benth. & Hook. f. acc. to Hemsl. Biol. Cent.-Am. Bot. ii. 206. *Tetrachyron manicatum*, Schlecht. l. c. — Cordillera near Vera Cruz, *Galeotti*, no. 2309; Mirador, *Liebmann*, no. 392, *Dr. Berendt*, and *E. W. Nelson*, no. 85; Orizaba, *Schaffner*, *Botteri*, no. 807; also Sierra del Borrego, above Orizaba, altitude 4,500 feet, *Pringle*, no. 6133.

25. C. Orizabaensis, Klatt. Branchlets pentagonal: lower leaves petiolate, large, 5 inches long, 3 inches wide, oblong, sinuate-undulate,

glabrous above, pilose on the nerves beneath: heads pedicellate in lanceolate-bracted corymbs: scales of the involucre biseriate, ovate, striate: rays 4 or 5, oblong; disk-flowers externally pubescent: chaff ovate, scarious, obscurely dentate at the apex: scales of the pappus linear-lanceolate, laciniate at the apex, shorter than the tetragonal hirsute achene. — Leopoldina, xxiii. 6. *Tetrachyron Orizabaensis*, Schz. Bip. *fide* Klatt, l. c. — Peak of Orizaba, altitude 8,000 to 10,000 feet, *Liebmann*, no. 390. Not seen by the writers. Description translated and condensed from the original characterization.

Subgenus 5. TEPHROCALEA, Gray. Heads few or solitary, rather large for the genus: scales of the pappus 4 to 5: leaves ovate, entire, abrupt at the base and slender-petioled, canescent-tomentose or -tomentulose beneath. — Proc. Am. Acad. xv. 38.

26. C. discolor, Gray, l. c. Leaves ovate-oblong, obtusish, mucronulate, glabrous above, very finely tomentulose beneath: heads about 5 at the summits of the branches, 9 lines in diameter including the spreading rays: pedicels long, an inch or more in length, very finely puberulent or nearly smooth. — Mexico without locality, *Th. Coulter*, no. 351. A very distinct species apparently never rediscovered.

27. C. tomentosa, Gray, l. c. Leaves ovate, subcordate, rounded at the apex, densely tomentose and canescent upon both surfaces when young but glabrate above: heads solitary, terminal: peduncles very tomentose, rather stout and somewhat thickened upward. — Between San Luis Potosi and Tampico, *Palmer*, no. 1108. Not since collected.

Species of uncertain affinities.

28. C. sessiliflora, Less. Shrub: leaves very obtuse or subcordate at the base: heads discoid, about 10-flowered: involucre cylindrical: chaff broad, obovate, muticous at the apex. — Linnæa, v. 158. — Mexico, *Humboldt*. A species as yet wholly obscure; the characters are drawn from Lessing's scanty description.

V. — A PROVISIONAL KEY TO THE SPECIES OF POROPHYLLUM, RANGING NORTH OF THE ISTHMUS OF PANAMA.

* Leaves with broad obtuse ovate or elliptic-oblong usually thin lamina, rather abruptly contracted at the base to a slender petiole.

\- Heads very long; involucral scales at maturity 8 to 12 lines in length: peduncles conspicuously clavate: erect scarcely distinct annuals.

1. P. macrocephalum, DC. Prodr. v. 648.
2. P. ruderale, Cass. Dict. Sci. Nat. xliii. 56.
3. P. ellipticum, Cass. l. c.

\- \- Heads shorter; involucral scales about half inch in length: peduncles scarcely or not at all thickened toward the summit.

\+ Leaves with pellucid glands on the surface as well as at the margins.

4. P. Ervendbergii, Gray, Proc. Am. Acad. xix. 35.
5. P. nummularium, DC. l. c. 649.

\+ \+ Glands of the leaves marginal or none.

= Leaves broad, thickish: petioles rather short: probably a single species.

6. P. viridiflorum, DC. l. c. 648.
7. P. Lindenii, Schz. Bip. in Seem. Bot. Herald, 308.

= = Leaves thin and delicate.

a. Heads nodding or almost pendulous.

8. P. nutans. Leafy shrub with slender terete fuscous branches (marked with small light colored lenticels) and almost filiform branchlets: leaves thin, elliptic, entire, or crenulate, obtuse but often mucronulate at the apex, obtuse or acutish at the base, 8 to 14 lines long, half as broad; marginal glands 4 to 6 on each side the leaf; petioles filiform, 3 or 4 lines long: heads numerous, about 9 lines long: peduncles clustered at the ends of the branches in 3's and 4's: involucral scales 5, oblong, obtuse, 6 lines long, somewhat carinate, green, with double row of linear glands: flowers white or nearly so, 9 lines in length; limb of the corolla sub-bilabiate, shallowly toothed: achenes 5 lines in length. — Collected by *C. G. Pringle*, in mountains near Lake Chapala, 16 December, 1889, no. 2976, and by the same collector on rocky hills, Querendaro, Michoacan, 25 October, 1892; later by *E. W. Nelson*, between Chilapa and Tixtla, Oaxaca, altitude 5,200 to 7,000 feet, no. 2170. Mr. Pringle's plants were at first determined as *P. Ervendbergii* and so distributed. On subsequent comparison with that species they appear thoroughly distinct, having only marginal glands on the leaves, nodding instead of erect peduncles, less deeply cleft corolla, and longer achenes.

b. Heads erect: slender annual.

9. P. Pringlei, Robinson, Proc. Am. Acad. xxvii. 178.

c. Heads erect: shrubs.

10. P. Jorullense, Cass. "Leaves 1 inch long, eglandular: petioles 6 to 7 lines long: scales of the involucre green." Dict. Sci. Nat. xliii. 57. *Kleinia Jorullensis*, HBK. Nov. Gen. & Spec. iv. 156, t. 356, whence description.

11. P. Nelsonii. Branching shrub, 1 to 2 feet high: stems terete, striate, purple: leaves chiefly opposite, rather small and distant; blade elliptic or oblong, obtuse, 6 to 8 lines long, 2 to 3 lines broad, rather gradually narrowed to a slender petiole (2 or 3 lines in length); glands few on the margin or often only a single one at the end of the mid-nerve: heads subcorymbose at the ends of the branches, 7 lines long, about 30-flowered; scales of the involucre 5, linear-oblong, acute, purple especially toward the summit, flat, marked with 2 rows of linear glands: corollas dark purple, $3\frac{1}{2}$ inches long: achenes strongly tapering, 3 to $3\frac{1}{2}$ lines in length. — Collected by *E. W. Nelson*, in Oaxaca, between Panixtlahuaca and Jaquila, altitude 5,000 feet, 26 February, 1895, no. 2399; also between Nopala and Mixistepic, altitude 800 to 4,000 feet, March, 1895.

* * Leaves rather broadly lanceolate, acute at both ends, slender-petioled.

12. P. Palmeri, Rose, Contrib. U. S. Nat. Herb. i. 338, t. 34.

* * * Leaves narrowly elliptic- or linear-oblong, obtuse or obtusish, gradually narrowed to a sessile or short-petioled base.

13. P. Seemannii, Schz. Bip. l. c.

14. P. obtusifolium, DC. l. c. 650.

15. P. decumbens, DC. l. c.

* * * * Leaves lance-linear, sessile, and amplexicaul.

16. P. amplexicaule, Engelm. in Gray, Pl. Wright. i. 120.

* * * * * Annuals or more commonly perennials, often shrubby at the base: leaves very narrow; truly linear or subulate, or lance-linear and acute or acutish, sessile or subsessile, but not amplexicaul.

+ Mexican species: corolla shallowly and regularly 5-toothed; teeth deltoid: achenes $2\frac{1}{2}$ to $3\frac{1}{2}$ lines long: involucral scales green or glaucous, not dark purple.

17. P. scoparium, Gray. Leaves truly linear or terete, half a line in breadth: peduncles inch or more in length. — Pl. Wright. i. 119.

18. P. pausodynum. Shrub: stems geniculate, branched, covered with smooth reddish brown cortex: branchlets straight, erect, sulcate-angulate, glaucescent: leaves scattered, linear-lanceolate, narrowed to an obtusish apex, attenuate at the base to a short petiole, slightly succulent,

3-nerved, slightly reticulated, 2 inches long, 2 to 2½ lines broad, entire; marginal glands elliptical, usually 2 or 3 on each side and often one at the end of each leaf: heads 6 to 8 lines long, 25–30-flowered, rather densely clustered in terminal flat-topped leafy cymose corymbs (2 or 3 inches in breadth); individual peduncles shorter than the heads: scales of the cylindrical involucre 5, oblong, obtuse or rounded at the apex, 5 lines long, 1 to 1½ lines broad, pale green, with a double line of dark linear glands near the middle: flowers white. — *P. Seemanni*, Wats. Proc. Am. Acad. xxiv. 57; Brandegee, Zoe, i. 313; not Schz. Bip. — Collected by *Dr. Edward Palmer* in crevices of exposed rocks in high mountains near Guaymas, Sonora, 1887, no. 279 (distributed as *P. Seemannii*, var.). According to Dr. Palmer's notes the plant is called *Maravilla* by the Mexicans and used for headache.

+ + Mexican species with corolla more deeply cleft and more or less distinctly bilabiate; teeth lanceolate; achenes 2½ to 3½ lines in length.

++ Achenes long and slender, tapering at the apex, about 4 lines long.

19. P. gracile, Benth. Leaves fleshy, subterete. — Bot. Sulph. 29.

20. P. n. sp.? aff. *P. gracile*. Leaves not fleshy, flat, very narrowly lance-linear, 1 to 2 inches long, a line or two broad, with regular marginal glands: heads solitary, terminal on very short slender peduncles: cylindrical involucre green, slender; scales with purple border and glands. — A tall slender, much branched leafy plant collected at Fronteras, Sonora, by *C. V. Hartman*, altitude 4,550 feet, 25 September, 1890, no. 8.

++ Achenes shorter, 2 to 3 lines long: involucre very dark-purple, often pruinose-glaucous.

= Spreading annuals: very likely a single species.

21. P. coloratum, DC. Prodr. v. 650.

22. P. tagetoides, DC. l. c.

= = Perennials, a little shrubby at the base.

a. Involucral scales obovate, very broad and obtuse.

23. P. filifolium, Gray, Proc. Am. Acad. xviii. 107, xix. 35.

b. Involucral scales narrower, oblong.

24. P. Linaria, DC. l. c. 649.

+ + + Lower Californian shrubs, with geniculate and much branched stems, short subulate fleshy leaves, and short many-flowered heads: achenes only 1½ lines in length.

25. P. crassifolium, Wats. Proc. Am. Acad. xxiv. 57.

26. P. tridentatum, Benth. Bot. Sulph. 30.

VI. — DESCRIPTIONS OF NEW OR LITTLE KNOWN PHANEROGAMS, CHIEFLY FROM OAXACA.

Discorea composita, Hemsl. Mr. E. W. Nelson has rediscovered this species at Santa Efigenia, Oaxaca, altitude 500 feet, 18 July, 1895, no. 2828, and also between Topana, Oaxaca, and Tonala, Chiapas, altitude 200 to 500 feet, 1 to 3 August, 1895, no. 2855. The specimens from Santa Efigenia represent the hitherto unknown staminate plant from which the following supplementary characters are derived: foliage and inflorescence of the ♂ plant as in ♀: segments of perianth 6, oblong, obtuse; the inner slightly larger: stamens 6, all perfect, free from each other and borne upon the base of the perianth-segments, the three opposite the outer segments a little shorter than the others: filaments not noticeably rigid nor flattened, considerably exceeding the very short anthers: the interior of the flower containing a conical rudimentary ovary.

Habenaria subauriculata. Glabrous, 5 to 10 inches high: tuberiform root single, ovoid, an inch long: stem flexuous, leafy: leaves ovate, acutish or acute, 3-ribbed, sheathing by the slightly narrowed base, 1 to 1½ inches long, a third or half as broad: spike 2 to 6 inches long, several – many-flowered: bracts ovate-lanceolate, acuminate, about equalling the ovary: flowers green: upper sepals 3-nerved, about 3 lines long, obtusish, the upper broadly ovate, galeate, obtusish, 3-nerved, 3 lines long; the lateral ones narrowly ovate, obtusish, slightly exceeding the upper one: lateral petals linear-oblong, obtusish, slightly falcate, subauriculate on the lower side at the base, otherwise entire, 2 to 2½ lines long; labellum deeply 3-parted, the divisions linear, the lateral divaricately spreading and slightly curved upwards, 2½ to 3 lines long, about equalling the middle lobe: spur slender, scarcely clavate, green, about 4 lines long. — Collected by C. G. Pringle, on grassy slopes, Las Sedas, Oaxaca, altitude 6,000 feet, August, 1894, no. 4830. Habit of *H. flexuosa*, Lindl., and *H. clypeata*, Lindl., but with lateral petals undivided.

Spiranthes Oaxacana. Glabrous (except flowers): root a fascicle of numerous thickened tuberiform fibres: stem erect, a foot to a foot and a half high bearing 1 or 2 foliar leaves at the base and loosely sheathed for the rest of its length by membranaceous striate-veiny ovate-acuminate bracts: leaves oblong, 3 inches or more in length, three fourths inch in breadth, sheathing at the narrowed base, scarcely persisting until the perfecting of the flowers: flowers in a dense ovate subcapitate spike, slightly exceeding the conspicuous ovate-acuminate

silvery diaphanous brown-veined bracts: sepals finely pubescent on the outer surface; the lateral sepals linear-oblong, 6 lines in length, obtuse, 3-nerved, not fleshy; the dorsal one ovate-lanceolate, obtusish, about the same length: petals linear-oblong, obtusish, 3-nerved, about equalling the sepals; labellum long-unguiculate; lamina oblong, 5 lines in length (about equalling or slightly exceeding the claw), 3½ lines broad, with a median lance-shaped callous thickening just above the thickish claw; the latter involute on the margin and somewhat sulcate above. — Collected by C. G. Pringle, on hills above San Felipe, Oaxaca, altitude 6,000 feet, 31 December, 1894, no. 6101.

Cranichis thysanochila. Glabrous throughout, 6 to 8 inches high: roots several, elongated, thick, tuberiform, obtuse, covered with fine short rootlets: leaves basal, ovate, acute, thin, smooth, 1½ to 3 inches long, half to two thirds as broad, subsessile; the contracted base membranous, amplexicaul: stem slender, flexuous, bearing about 5 lanceolate attenuate sheathing green bracts: spike 2 to 4 inches in length, only moderately dense: floral bracts ovate-lanceolate, sharply acuminate, green, 3 lines in length, about equalling the ovary: flowers spreading, nearly half inch in length: floral envelopes white; sepals oblong, obtuse, 1-nerved, subequal, about 2 lines in length; lateral petals broadly spatulate or narrowly obovate, obtuse, 1-nerved, about equalling the sepals in length; lip superior, obovate, cuneate, short-clawed, biauriculate at the base, terminated at the apex by an emarginate and fimbriated appendage; the inner surface longitudinally somewhat 2-crested. — Collected by C. G. Pringle, on calcareous banks, Las Hoyas Cañon, Oaxaca, altitude 4,500 feet, 2 November, 1894, no. 6023. This species differs from others of the genus in the fringed apex of the lip.

Microstylis platyglossa. Erect, a foot high, glabrous, 1-leaved: bulb three fourths inch in diameter: sheath subsolitary, short, obtuse: leaf oval, amplexicaul at the subcordate base and rounded or very obtuse at the apex, 1¾ to 2½ inches long, 15 to 18 lines broad: peduncles about 2 inches long; racemes 6 to 8 inches long, bracts ovate, acute, a third to half as long as the slender pedicels, these nearly horizontal, 1½ lines long: flower purple (the labellum sometimes lighter colored), inverted by the torsion of the pedicels, bringing the labellum downward: sepals oblong, obtuse, 1-nerved, about a line long, the upper odd one erect, the lower pair reflexed: lateral petals linear, reflexed; labellum broadly deltoid, one third broader than long, obtuse, about a line in length, dark purple or yellow (both colors sometimes occurring on the same specimen). — Collected by C. G. Pringle, on the Sierra de San Felipe, Oaxaca,

altitude about 10,000 feet, August, 1894, nos. 5614, 5614 a, and by E. W. Nelson, in the same locality, no. 1140.

Microstylis streptopetala. Slender, 6 to 18 inches high, 1-leaved: bulb oval, half inch in diameter; sheaths 2, closely surrounding the base of the stem, obtuse: leaf elliptic-oblong, cuneate at the amplexicaul base, acutish or obtuse at the apex, 1½ to 3 inches long, 4 to 8 lines broad: naked and angled peduncle about equalling the stem (2 to 4 inches in length): spicate inflorescence strict, slender, 2 to 8 inches long, 2 to 3 lines in thickness, very densely flowered above but looser below: bracts very short ovate-deltoid, obtusish: flowers sessile: sepals 3-nerved, green, oblong, obtuse, the upper somewhat falcately incurved, 1½ lines long, green; lower 2 lines long: lateral petals linear, spirally coiled or twisted, greenish white; labellum deltoid, strongly auriculate, minutely 3-toothed at the apex, half as long as the upper sepals, in dried state nearly black; margins somewhat thickened and slightly incurved; auricles oblong and obtuse.— Collected in flower by C. G. Pringle on dry pine ridges, Sierra de San Felipe, Oaxaca, at 9,000 to 10,000 feet altitude, 30 July, 1894, no. 4808. Most nearly related to *M. montana*, Roth, but with very different lip.

Phoradendron Forestieræ. Glabrous throughout: branches terete, olive-green; branchlets ancipital: leaves narrowly oblong, with rounded apex and cuneately narrowed base, sessile, 1-nerved, or very obscurely 3-nerved, yellowish green, inch to inch and a half long, 1½ to 2½ lines wide: inflorescences of ♀ plant axillary, solitary, opposite, moniliform, 5 to 9 lines in length, flowers in 1 to 4 globular 10–12-flowered clusters, becoming deeply imbedded in the substance of the nodular rhachis; the clusters 2½ lines in diameter, tawny in color; the intervening necks 1 to 1½ lines long, about half enveloped in a loose sheath; the margins of the sockets holding the flowers finely ciliolate: divisions of the perianth 3 (rarely 4), deltoid, the free portion not a third of a line in length.— Collected by C. G. Pringle on hills between Tehuacan and Esperanza, Puebla, altitude 6,000 feet, 23 December, 1895, no. 6290. A species parasitic on *Forestiera*, and apparently most nearly related to *P. brachystachyum*, Oliv., which, however, is tomentulose on the branchlets, has simple not moniliform inflorescences, and larger more distinctly veined leaves.

Euphorbia Luciismithii. Tall branching tomentulose glaucous shrub, 10 to 15 feet in height: branches subterete, striate: leaves verticillate, 2–5-nate, elliptical, obtuse at both ends or subacute at the base, glabrous or glabrate above, paler and soft grayish-tomentulose beneath,

10 to 16 lines long, a third to half inch broad: petioles 4 to 6 lines long, tomentulose: cymes compound, terminal, flat-topped, leafy: floral leaves oblanceolate, cuneate, mucronulate, 1-nerved, white or rarely red, about 3 lines in length, a line in breadth: involucres campanulate, puberulent, nearly sessile; lobes 5, fimbriated; glands 5, oblong; appendages oblong or subrotund, undulate, white, three fourths line long: capsules 3-lobed, nearly 3 lines long, glabrous seeds ashy, oblong, somewhat 4-angled, faces rugulose and marked with fine irregular brown lines. — Collected by Lucius C. Smith, at Rancho de Calderon, altitude 5,500 feet, 13 August, 1894, no. 181; also at Jaycatlan, altitude 4,300 feet, 10 September and 4 November, 1894, no. 182; also by C. G. Pringle, in rocky gulches, Monte Alban, Oaxaca, altitude 5,800 feet, 14 September and 27 November, 1894, no. 4903, and by E. W. Nelson, six miles above Dominguillo, altitude 4,500 to 5,500 feet, 30 October, 1894, no. 1880. Most nearly related to *E. leucocephala*, Lotsy, from which it differs in pubescence and form of appendages.

Euphorbia Oaxacana. Stems subterete, 2 to 5 feet high, green, rather densely pubescent near the summit, soon glabrate: leaves alternate, ovate-elliptic, entire, thin, obtuse at each end, appressed-villous on both sides and ciliated, 10 to 16 lines long, half as broad; slender soft-pubescent petioles becoming half inch in length: inflorescence a long narrow compound somewhat secund naked panicle: its leafless branches alternate, 1 to 3 inches in length, again branched and rather densely flowered, tomentose; buds roseate, tomentose: involucres in subcapitate peduncled cymes, white-tomentose as well as the short (1 to 1½ lines) linear-spatulate branchlets; glands 5, equal, oblong, with white subrotund or oblong 2–3-crenulate appendages (about a line long); involucral lobes fimbriate, green: styles deeply 2-parted; capsule green, glabrous, 1⅓ lines in diameter: seeds oval, ashy, faveolate. — Collected by C. G. Pringle, on ledges, Monte Alban, Oaxaca, altitude 5,800 feet, 23 November, 1894, no. 6070.

Euphorbia subcærulea. Erect much branched annual, glabrous throughout, 2 feet in height: stem and slender branches terete, striate, livid: leaves elliptic-ovate, entire, thin, green above, a little paler and glaucescent beneath, rounded or very obtuse at the base, rounded or retuse at the apex, 3 to 8 lines long, nearly two thirds as broad: petioles filiform, nearly equalling the leaves: inflorescences open cymose-paniculate: floral leaves very small, elliptic-ovate to subrotund, subsessile, white or bluish: involucres (including appendages) 1½ lines in diameter; glands 5, oblong, sessile, with suborbicular entire appendages, these at

first light blue, then changing to white, half line in diameter, spreading: stigmas deeply 2-parted; divisions clavellate: capsule smooth, about a line in diameter: seeds oblong, light blue, three fourths line in length, deeply pitted and with a conspicuous caruncle. — Collected by C. G. Pringle, on dry banks, Tomellin Cañon, Oaxaca, altitude 3,500 feet, 9 December, 1895, no. 6265.

Cardiospermum Galapageium. A slender climber with furrowed tomentulose stem aud biternate leaves: leaflets oblong-lanceolate, attenuate, entire, abrupt at base, finely tomentose upon both surfaces, slightly paler beneath, prominently 1-nerved and pinnately veined, the lateral leaflets of each division much smaller than the terminal: peduncles slender, spreading, tendriliferous beneath the umbelliform inflorescence: sepals 4, the outer pair a line, the inner 2 lines long: glands upon the upper side of the disk short, rounded, not at all cornute. — *C. Corindum*, Rob. & Greenm. Am. Jour. Sci. ser. 3, L. 145, in part, not L. — Collected in the southern part of Albemarle Island, July, 1891, by Dr. G. Baur, no. 61. Distinguished by its narrow entire leaflets. *C. integerrimum*, Radlk., the only other species with similar foliage, known to the writers, has a 5-sepaled calyx and cornute glands.

Erythræa retusa. Erect glabrous annual, 6 or 8 inches in height: stem leafy, 4-angled, branched; branches erect or nearly so, mostly rather short and again branched: leaves oblong-elliptical, obtuse or mucronulate at the end, somewhat narrowed at the base, half inch long, 2 to 3 lines broad, the uppermost narrower and lanceolate: pedicels both terminal and lateral on the branches, short, 1 to 2 lines in length: flowers 4-merous, calyx-lobes lance-linear, attenuate, slightly carinate, 2 lines in length, green with narrow scarious diaphanous margins: corolla-lobes oblong, retuse, a line long, pale yellow in a dried state: fruit dark brown, $2\frac{1}{2}$ lines long. — Collected by C. G. Pringle, in springy meadows, Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 11 December, 1895, no. 6300. This species differs from *E. divaricata*, Schaffner, in its much shorter pedicels and erect not widely spreading branches; from *E. tetramera*, Schiede, in its retuse by no means acute corolla-lobes: from *E. stricta*, Schiede, in its 4-merous flowers. The flowers are small and appear to remain closed and to be cleistogamous.

Nama Pringlei. Low slender branching annual of similar habit to the following and with similar pubescence: leaves oblong, entire, rounded at the apex, rather gradually narrowed at the base to a short slender petiole: calyx as in the last: corolla showy, 5 lines long and equally broad, with short yellow tube and deep blue spreading rather deeply 5-lobed

limb: styles a line long: capsule rugose, broadly ovate with depressed summit. — Collected by C. G. Pringle, on hills near Tehuacan, Puebla, altitude 5,500 feet, 24 December, 1895, no. 6286. A very attractive species, nearly related to *N. latifolium*, Gray, but with much longer calyx and larger corolla as well as different pubescence.

Nama Pueblense. Slender weak dichotomously branched annual, 3 to 6 inches high, spreading-pubescent: leaves ovate, obtuse, entire, thin, 10 to 12 lines long, half as broad, rather abruptly contracted to a slender petiole and covered on both surfaces with fine sub-appressed hairs with globular bases; and below with short golden yellow pedicelled glands: flowers short-pedicelled, grouped by 2's or 3's near the axils or extra-axillary and solitary somewhat above the fork of the terete purplish stem: calyx-lobes in fruit 4 lines in length, spatulate, densely hirsutulous with spreading white hairs: corolla small, pale blue (in dried specimen), tubular, with scarcely ampliated shortly 5-lobed limb, 2 to 2½ lines long: styles half line in length: capsule narrowly oblong, hispidulous near the apex, rugose, about 2 lines in length, obtusish: seeds brownish, rugose. — Collected by C. G. Pringle, on hills near Tehuacan, Puebla, altitude 5,500 feet, 24 December, 1895, no. 6287. Habitally near to *N. latifolium*, Gray, but differing in its much longer more hirsute calyx, narrower capsule, and having leaves evenly pubescent over the entire surface instead of chiefly on the veins.

Berendtia levigata. Shrub 2 to 3 feet high, glabrous but somewhat vernicose especially upon some of the younger parts: stems and branches covered with a gray bark; branchlets very leafy especially at the ends: leaves rather broadly lanceolate or oblanceolate, sharply few-toothed above the middle and acute, cuneate to an entire short-petioled base, glabrous or (under a lens) slightly pulverulent but green on both surfaces and sometimes a little lucid, of firm texture, 1¼ to 1½ inches long, half as broad: peduncles opposite in the upper axils, 1-flowered, bibracteolate at or below the middle, the bractioles bearing rudimentary buds in their axils: calyx strongly prismatic, as in *Mimulus*, 6 lines in length, with 5 short broad subequal acuminate-mucronate teeth: corolla showy, much exserted, 1½ inches in length; throat rather gradually ampliated, orange with crimson spots; limb patulous, of broad rounded lobes: stamens searcely exserted: capsule 6 lines in length. — Collected by C. G. Pringle, on calcareous hills near Tehuacan, Puebla, altitude 5,500 feet, 24 December, 1895, no. 6294.

Castilleia aurea. Slender annual of § *Epichroma*, a foot high, with terete glabrous flexuous branched stems and delicate pectinate

foliage: leaves inch to inch and a half long, with 6 to 9 filiform-linear segments and narrow rhachis: flowers 9 lines in length, in long rather dense puberulent racemes; lower bracts much like the leaves, the upper gradually reduced to small lanceolate or subulate scales; pedicels erect, slender, 2 to 4 lines long: calyx fuunel-form, gradually and considerably ampliated, with broad orifice oblique, scarcely split ventrally and not at all dorsally, about half inch in length, golden yellow: corolla concolorous, about 9 lines in length, puberulent upon the considerably exserted galea: capsule ovate-oblong, acutish, 3 lines in length. — Collected by C. G. Pringle, on wet bluffs of barrancas above Cuernavaca, State of Morelos, altitude 7,000 feet, 19 November, 1895, no. 6204. Nearly related to *C. tenuifolia*, Mart. & Gal., and *C. gracilis*, Benth., but distinguished from the former by its yellow flowers, more dense and continuous inflorescence, narrower acuter capsule, and smaller seeds; from the latter by the color of the flowers and much more exserted galea, denser racemes, etc.

Carlowrightia glandulosa. Low much branched shrub, 1 to 3 feet in height, densely glandular-tomentose and viscid: cortex of the older branches pale gray: leaves ovate, acute, entire, cordate, soft-pubescent upon both surfaces, the larger ones 12 to 15 lines in length, three fourths as broad, the floral ovate-lanceolate to lanceolate, half inch in length, somewhat acute at the base: petioles nearly or quite half the length of the leaf: flowers 1 to 4 in the opposite axils, closely sessile: calyx-tube very short, divisions narrowly linear-attenuate, 3 lines in length, glandular-pubescent: corolla bluish, 4-parted; the emarginate posterior lobe purple-veined and marked with yellow at the centre; tube 2 lines long; lobes 4 to 5 lines in length: capsule glabrous and lucid, three fourths inch long, with pungent tip, seeds orbicular, dark brown with lighter colored margin, $2\frac{1}{2}$ lines in diameter. — Collected by C. G. Pringle at Monte Alban, near Oaxaca, altitude 5,500 feet, 5 December, 1895, no. 6276. This species is nearest *C. pubens*, Gray, but differs from it most obviously in its cordate and considerably larger lower leaves, as well as larger flowers and seeds.

Carlowrightia (?) Pringlei. Shrub, 3 to 5 feet high, with slender glabrous terete stems covered with smooth grayish brown cortex: leaves ovate-lanceolate, acute, entire, rounded at the base, glabrous on both surfaces or minutely strigillose on the veins beneath, 8 to 12 lines long, a third as broad; petioles a fourth inch long, glabrous but often with a tuft of white hairs at the base within: floriferous branches slender, recurved: flowers sessile, secund, solitary or 2 together in the same axil, the opposite axil being empty: bracts small, subulate: calyx-tube very short;

segments 5, linear-attenuate, glandular-pubescent, 1½ lines long: corolla bluish white (in dried specimen): tube slender, 4 to 6 lines long, about equalling the 4 lobes: anther-cells equal and subcontiguous, muticous: capsule glabrous, half inch in length. — Collected by C. G. Pringle, dry slopes, Tomellin Cañon, Oaxaca, altitude 3,500 feet, 30 November, 1895, no. 6261. A plant which with about equal propriety might be referred to *Dianthera*.

Jacobinia candicans, Benth. & Hook. f. "Gen. ii. 1115" according to Hook. f. & Jacks. Ind. Kew. i. 1246. *Dianthera candicans*, Benth. & Hook. f. "Gen. ii. 1113" according to Hemsl. Biol. Cent.-Am. Bot. ii. 517. *Adhatoda candicans*, Nees in DC. Prodr. xi. 396. *Jacobinia Mexicana*, Hemsl. l. c. 521, as to plants of *Galeotti* and of *Liebmann*. Excellent and copious material of this doubtful plant has now come to hand from the following sources. Vicinity of Cuicatlan, Oaxaca, altitude 1,800 to 2,500 feet, E. W. Nelson, no. 1698, and in same locality V. González, no. 48; also in Tomellin Cañon, altitude 2,500 feet, C. G. Pringle, nos. 5638, 6260. The plant is a shrub 3 to 5 feet high with the whole habit and inflorescence as well as corolla of *Jacobinia*, to which it would seem best to refer it notwithstanding its slightly disjoined anther cells. Indeed the very close habital resemblance between this species and *Jacobinia Mexicana* has led to a confusion of the two for Mr. Hemsley in the places cited ascribes Galeotti's no. 911 both to *Dianthera candicans* and *Jacobinia Mexicana*. The plants of recent collection mentioned above correspond in all points to Liebmann's specimen from Tehuacan, and differ much in calyx and bracts from Seemann's plant of N. W. Mexico. In the latter plant (*J. Mexicana*, Seem.) the bracts are minute, much shorter than the 5-toothed calyx. In the former (*J. candicans*) the bracts about equal the calyx and this is much more deeply 5-cleft. The corolla of *J. candicans* is bright scarlet rather than purple as described by Nees.

Oldenlandia xestosperma. Erect glabrous perennial, several-stemmed from a slightly ligneous base: stems terete, moderately branched above, 1 to 2 feet high: leaves linear, 1-nerved, an inch to an inch and three fourths in length, less than a line in breadth: inflorescences terminal few-flowered cymes; bracts small, subulate; pedicels filiform, 1 to 3 lines in length: flowers strongly heterogone-dimorphous: calyx-lobes in anthesis but half line long, subulate, about equalling the tube: corolla purplish, nigrescent in drying, 4 lines in length, gradually widened from the base; limb of 4 triangular erect teeth: capsule obovate, 2 lines in length, entirely inferior, dehiscing to the base: seeds slightly angled,

light colored, yellowish, highly polished and shining, half line or less in diameter. — Collected by C. G. Pringle in open glades, Sierra de San Felipe, Oaxaca, altitude 8,000 feet, June, 1894, no. 4692. Habit of *Houstonia purpurea*, var. *tenuifolia*.

Eupatorium eriocarpum. Stem tall, 5 to 8 feet in height; branches glabrate, angled, lucid, yellowish brown; branchlets puberulent but soon glabrate: leaves opposite, ovate or rhombic ovate, crenate-serrate, acuminate to an obtusish apex, cuneate or rather abruptly contracted at the mostly unequal-sided base, glabrous on both surfaces except on the veins and at their axils, 2 to 3 inches in length, a third to half as broad, neither coriaceous nor rugose, scarcely paler beneath, pinnately veined; petioles 2 to 3 lines long: thyrsoid inflorescences terminal on the upper branchlets and together forming large ovate leafy panicles; slender peduncles and short pedicels often nodding, covered with fine and somewhat sordid pubescence: heads mostly 5-flowered, 5 to 6 lines in length: scales of the involucre ovate to ovate-oblong, obtuse, finely striate, ciliolate, imbricated in 3 or 4 series: corolla-tube slender, $2\frac{1}{4}$ lines in length, larger at the base than at the summit, without any apparent throat; teeth very short: style branches dark colored, strongly clavate: achenes turbinate, so densely covered with white woolly or silky pubescence as to obscure their 5 angles, about 2 lines in length, narrowed at the base to a glabrous callous and somewhat pungent lip; pappus-bristles white, slightly exceeding the achene, about 50 in number. — Collected by C. G. Pringle, in Tomellin Cañon, Oaxaca, altitude 3,000 feet, 22 December, 1894, no. 6112.

Eupatorium rupicola. Shrub, 5 to 10 feet in height: branchlets reddish brown, terete, finely and densely fuscous-puberulent: leaves opposite, petiolate, ovate, acuminate, crenate-serrate, 3-nerved, rounded or obtusish at the base, green and sparingly puberulent or glabrate above, paler and grayish-tomentulose beneath, 14 to 18 lines long, 7 to 12 lines broad; petioles reddish, puberulent, 3 lines long: inflorescences 6–10-headed flat-topped umbelliform corymbs terminating short opposite lateral and terminal branchlets (1 to 2 inches in length), and together forming more or less elongated leafy panicles; pedicels densely pubescent, ascending, 2 to 4 lines long, subtended at the base by very reduced leaves and often bearing one or more short subulate bractlets: heads $3\frac{1}{2}$ to 4 lines in height; involucre relatively short, imbricated in about 2 series; scales 10 to 15, subequal, $1\frac{1}{2}$ lines in length, oblong, acutish, puberulent; flowers about 16, purplish white: corolla $2\frac{3}{4}$–3 lines, gradually enlarged upward: achenes linear, a little over a line in length, rather densely white-pubes-

cent. — Collected by C. G. Pringle on dry ledges of the Sierra de San Felipe, Oaxaca, altitude 7,500 feet, 9 October, 1894, no. 4970.

Chrysopsis Brandegei. Low villous perennial, 3 to 5 inches high, with spreading branched scaly rootstock and numerous densely tufted stems: leaves spatulate, entire, gradually narrowed below into slender petioles, rounded at the summit but mucronate-acuminate at the very apex, 1-nerved, finely grayish-pubescent and covered with very short yellowish glandular or resinous-tipped hairs (so short as to appear when viewed from above merely as sessile globules), and spreading-villous on the edges, 7 or 8 lines long including the petioles; lowest leaves shorter, densely crowded at the base, and often canescent with more appressed pubescence: peduncles terminal, slender, erect, flexuous, terete, 1½ to 2 inches long, villous with spreading hairs and also closely covered with the minute glandular hairs, entirely leafless but sometimes bearing one or two short filiform bracts: heads solitary, discoid, 6 to 8 lines in diameter, half inch in height, 40–45-flowered: scales of the involucre very unequal, imbricated in about 4 series; the outer ones very small, a line in length, very villous, the inner oblong, purplish, rather abruptly but acutely pointed, flat and smoothish, ciliolate on the margin, 3½ lines long, half to two thirds line broad: corollas 5-toothed, golden yellow, glabrous, 4 lines long: pappus manifestly double, the outer bristles very unequal: stigmas sometimes 3: achenes (immature) densely silky-villous, about a line long. — *Chrysopsis* sp., Brandegee, Zoe, iv. 206. — Collected by T. S. Brandegee at San Pedro Martir, Northern Lower California, May, 1893.

Bigelowia pyramidata. Shrub, 2 to 3 feet high, much branched: branches white-woolly; branchlets striate: leaves fascicled, linear-acicular, entire, somewhat pungent, white-woolly beneath, strongly revolute at the margins, pale green and grooved above, 4 to 14 lines long, half line in breadth: inflorescences terminal pyramidal panicles: heads small, numerous, sessile or subsessile, spicately arranged along the spreading-ascending branches, subtended by fascicles of short spreading pungent leaves, discoid, few (5–7)-flowered: scales of the involucre linear-lanceolate, acute, scarious, diaphanous: flowers pale yellow, pappus scarcely tawny, of numerous fine unequal bristles; young achenes silky, the mature not seen. Collected by C. G. Pringle, on hills above Oaxaca, altitude 5,500 feet, 16 November, 1894, no. 6048. A species anomalous in its spicate-paniculate inflorescence but with the other characters of *Bigelowia*.

Lagascea tomentosa. Rather stout: stem subsimple, terete,

tomentose, also somewhat glandular and villous, purplish: leaves ample, ovate, acuminate at the apex, acute at the petiolate base, dentate, tomentose on both surfaces, pale beneath, 3 to 5 inches long, nearly $1\frac{1}{2}$ to 2 inches broad, scabrous on the margins: petioles 4 or 5 lines long, densely pubescent: inflorescences enveloped in ovate-lanceolate acuminate pubescent and ciliate bracts (6 to 8 lines long, 2 to 3 lines broad): involucres numerous, closely aggregated, villous, 3 lines in length, 1-flowered, unequally dentate, glandular in lines: corolla long, 6 lines in length, externally pubescent, the ampliate cylindrical throat exceeding the limb and the more slender proper tube: mature achenes not seen. — Collected by E. W. Nelson between Ayusina and Petatlan, Guerrero, altitude 5,000 to 7,000 feet, 14 December, 1894, no. 2121.

Trigonospermum tomentosum. Stout branching pubescent herb: stem terete, brownish or dark colored: leaves rhombic-ovate, 3-nerved from above the abruptly contracted then cuneately narrowed base, serrulate, acuminate, green and becoming scabrous above, paler and densely tomentose beneath, including the narrowed petiole-like base, 4 to 8 inches long, half as broad: inflorescence a much branched corymbose panicle, densely covered with short dark glandular-tipped hairs; bracts subulate: heads half inch in diameter: involucral scales about 2-seriate; the outer oblong, acutish, 3-nerved, ciliated; the inner broadly obovate, abruptly acuminate: ray-flowers 5; ligules broad, reversed-deltoid, deeply 3-lobed, bright orange-yellow, $3\frac{1}{2}$ lines long; disk-flowers about 25, concolorous: chaff hyaline, obovate-cuneate to suborbicular, ciliated. — Collected by E. W. Nelson on the western slope of Mt. Zempoaltepec, Oaxaca, altitude 7,700 to 8,000 feet, 5 to 13 July, 1894, nos. 610, 617, and later between Panixtlahuaca and Jaquila, altitude 1,000 feet, 26 February, 1895.

Montanoa macrolepis. Stem, 3 to 5 feet in height, terete, fuscous, glabrous or somewhat pubescent: leaves opposite, sinuately 3-lobed; the lamina 3 to 5 inches long, 2 to 3 inches broad, very scabrous-pubescent above, somewhat paler and sparsely pubescent or glabrate beneath, 3-nerved above the base, and contracted below to a somewhat toothed wing, which does not quite reach the stem but terminates gradually or abruptly (usually with two rounded auricles), leaving a short naked petiole; lobes undulate-denticulate; the lateral short, broad, blunt or again subbilobed; the terminal ovate, obtuse, acutish or even acuminate: heads rather few and large, cymose-corymbed, individually pedunculate or grouped by 2's or 3's at the ends of the branches: involucral scales subbiseriate, oblong, obtuse or rounded at the apex, $3\frac{1}{2}$ lines long: ray-

flowers 10–12; ligules 6 lines long, 2 to 3 lines broad; disk-flowers numerous, with the tube about a third as long as the ampliated throat: fruiting heads globose, $1\frac{1}{4}$ inches in diameter; achenes 2 lines long: chaff lanceolate-attenuate, straight-pointed or nearly so, puberulent or almost glabrous except the strong ciliation of the margins, 4 to 5 lines long in anthesis, becoming 8 lines long in fruit. — Collected by C. G. Pringle, in gulches of hills of Las Sedas, Oaxaca, altitude 6,000 feet, 29 September, 1894, no. 4932, also by L. C. Smith, at Nacaltepec (Salomé), Oaxaca, altitude 6,500 feet, 21 September, 1895, no. 818.

Montanoa Rosei. Shrub 8 or 10 feet high: leaves opposite, slender-petioled, rhombic-ovate, serrate, not lobed, acuminate at the apex, cuneate at the base, rather harsh in texture, scabrous and somewhat rugose above, scarcely paler, finely pubescent and glandular-dotted beneath, 3 to 4 inches long, half as broad: corymbs ample: bracts linear: involucral scales lance-attenuate, sub-uniseriate, silky-villous, $2\frac{1}{2}$ to 3 lines in length: disk-flowers about 4, with tube slender, nearly equalling the throat; rays about 3, about 2 lines in length: chaff densely fulvous-woolly. — *Montanoa* (*Enocoma*) sp., Rose, Contrib. U. S. Nat. Herb. i. 103. — Collected by Dr. E. Palmer, at Alamos, W. Mexico, 26 March to 8 April, 1890, no. 394.

Viguiera Nelsonii. Stem terete, densely silky-villous with white subappressed hairs: leaves attenuate at both ends, sessile, 3-nerved from above the base and pinnately veined, appressed silky-villous upon both surfaces, more densely so and paler beneath, 3 to 6 inches or more in length, $\frac{1}{2}$ to $1\frac{1}{4}$ inches in breadth: heads 12 to 20 in number, 12 to 18 lines in diameter, borne in a terminal corymbose panicle; the individual peduncles an inch or two long: involucral bracts 2–3-seriate, narrowly oblong-lanceolate, silky-villous especially near the margins: somewhat thickened at the base; the tips lax and spreading: rays about 10, orange-yellow, oblong, slightly 2–3-toothed at the apex, 6 to 8 lines in length: disk-flowers more than 50, concolorous: chaff carinate, with strong midrib excurrent as a spreading tip: achenes somewhat compressed and inconspicuously 4-angled, appressed-villous: pappus of two aristæ somewhat broadened at the base, and intermediate squamellæ two on each side, ovate, ciliate-fringed. — Collected by E. W. Nelson, between Chilapa and Tixtla, Guerrero, altitude 5,200 to 7,000 feet, 17 December, 1894, no. 2169, and by L. C. Smith in mountains of Huitzo, Oaxaca, altitude 6,500 feet, 16 November, 1895, no. 899. As to character of achenes a dubious intermediate between *Viguiera* and *Encelia*, but in habit approaching more closely species of the former genus.

Verbesina Nelsonii. Stout, apparently herbaceous: stem striate-angulate, puberulent under a lens, internodes entirely wingless or with a broadish irregular deciduous corky wing near the summit: leaves green and glabrous on both surfaces, oblong, acuminate, penninerved, crenate-serrate, 6 to 8 inches long, 1½ to 2 inches broad, below the middle slightly narrowed and somewhat crisped or undulate; the base broadly auriculate and amplexicaul, midrib prominent beneath, pale: heads numerous, of medium size, 4 to 5 lines in diameter, in a very dense terminal compound corymb; bracts oblong, small, scarcely herbaceous: pedicels tomentulose: involucre campanulate; scales about 10, subuniseriate, oblong, obtusish, 2 lines long; ray-flowers 4 to 6; ligules very small, yellow, 2 to 2½ lines long, nearly a line in breadth: chaff obovate, mucronate, pubescent on the outer surface especially on the prominent keel: achenes a line long, hispidulous, with conspicuous wing on each edge, awns subequal. — Collected by E. W. Nelson, between Ayusinapa and Petallan, altitude 5,000 to 7,000 feet, 14 December, 1894, no. 2118.

Verbesina Smithii. Branching shrub: branches glabrous, wingless, covered with a pale grayish cortex roughened with numerous lenticels: branchlets gray-tomentose: leaves alternate, lanceolate, attenuate at both ends but obtusish and mucronulate at the apex, rather shallowly serrate-dentate except at the cuneate short-petioled base, bright green and scabrous-puberulent above, white-tomentose beneath, 3 to 4 inches long, 10 to 14 lines broad: heads small, 2 lines high, 3 lines broad, not very numerous in small terminal corymbs; these 2 inches in diameter not exceeding the surrounding leaves: bracts small, grayish-tomentose as well as the pedicels: involucral scales about 3-seriate, elliptic-oblong, obtuse, green, pubescent on the outer surface, ciliated, a line long: disk-flowers 30 to 35; ray-flowers about 8; ligules yellow, 1½ to 2 lines long; chaff obovate, obtusish, yellow toward the summit, puberulent on the outer surface: achenes (immature) distinctly winged on each side; awns 2, slightly unequal. — Collected by L. C. Smith, at Jayacatlan, Oaxaca, altitude 4,500 feet, 10 September, 1894, no. 132.

Verbesina trilobata. Stems 5 to 10 feet in height, branched, glabrous, lucid, wingless, covered with light colored cortex: leaves opposite, decussate, rhombic in general outline, strongly 3-lobed, denticulate, gradually narrowed to a subsessile base, scabrous-puberulent above, grayish-tomentose beneath, subpalmately and rather obscurely 3–5-nerved from considerably above the base and reticulate-veined; terminal lobe elongated, ovate to oblong-lanceolate, acuminate; the lateral much shorter and rather blunt; sinuses rounded: corymbs much

branched, terminal, leafy-bracted at the base; bracts oblong-lanceolate, acute; pedicels finely grayish-tomentulose; heads rather small, numerous, radiate, few-flowered; involucral scales about 3-seriate; the outer considerably shorter, linear-oblong, obtuse, 1 to 1½ lines long with subherbaceous tips; inner scales subscarious, about 3 lines long, a line broad, acute, glabrous, except the ciliolated margins: disk-flowers about 12; corollas glabrous; ray-flowers 2 to 3; ligules golden-yellow, 3½ to 4 lines long: mature achenes 2 lines long, conspicuously winged on each margin, hispidulous on the surfaces; awns subequal. — Collected by C. G. Pringle, in rocky gulches, Monte Alban, Oaxaca, altitude 5,600 feet, 15 August, 4 October, 1894, no. 4875.

Verbesina variabilis. Shrub: branches striate-angled, mostly wingless and nearly glabrous: branchlets hoary-puberulent or glabrous, usually bearing narrow irregular deciduous brown corky wings decurrent from the bases of the petioles: leaves alternate, short-petioled, ovate or lance-oblong, sharply and finely serrate or mucronulate-denticulate, acute to shortly acuminate at the apex, cuneately narrowed at the base, 2 to 3 inches long, 9 to 12 lines broad, above green, strigillose-puberulent and very scabrous to nearly smooth; below scarcely paler, soft-pubescent on the pinnate and reticulated veins or quite glabrous: heads of middle size in terminal subsimple or compound corymbs, pedicels grayish-tomentose to merely puberulent: involucral scales about 2-seriate, green, oblong, obtusish; ray-flowers 10 to 12, yellow; ligules 6 lines long, about 2 lines broad, finely 2–3-dentate at the apex; disk-flowers about 60, pubescent: chaff cuneate, the apex truncate with short recurved apiculus: achenes very narrowly winged on both margins, about 1½ lines long: awns 2, subequal. — Collected in three rather different forms, which, however, appear to have no satisfactory specific differences. The first, which may be regarded as the typical form, has rather broad dull green very pubescent leaves. It was collected by C. G. Pringle, Sierra de San Felipe, altitude 9,500 feet, 24 September, 1894, no. 4918, by E. W. Nelson, 18 miles southwest of the city of Oaxaca, altitude 7,500 to 9,500 feet, 10–20 September, 1894, no. 1393, and by C. Conzatti on Sierra de San Felipe, altitude 9,000 feet, 29 November, 1895, no. 31. A second form collected by Mr. Nelson on the top of the Sierra Madre near Chilpancingo, Guerrero, altitude 9,000 to 10,200 feet, 24 December, 1894, no. 2240, differs only in having narrower oblong leaves, which are somewhat lucid above and somewhat less pubescent. A third form, secured by Mr. Nelson at same place and date, no. 2215, has narrow oblong leaves, which are quite glabrous

beneath, and slightly lucid but finely scabrous-puberulent above. The species, to judge from characters, must be near *V. Seemannii*, Schz. Bip.

Dahlia tenuis. Root a cluster of 6 or 8 stout fibres, each enlarged and tuberiform in the middle: stem single, erect, very slender, 1 to 2½ feet high, simple below, covered with a short and dense pubescence, almost tomentulose: leaves small for the genus, pinnate to bipinnate, somewhat deltoid in general outline, on slender divaricately spreading petioles of nearly their own length; leaflets lanceolate, acute or acuminate at both ends, finely and sharply serrate or irregularly 2–3-lobed, green and nearly or quite glabrous above, pale and finely pubescent beneath, 8 to 12 lines in length, 3 to 4 lines in breadth: heads few and subcorymbose, or even solitary, including the rays 1½ to 2 inches in diameter: outer involucre of about 6 narrow thickish obtuse bracts, reflexed during anthesis; the inner scarious bracts lance-oblong, about 6 lines in length: rays about 8, pistiliferous. — Collected by E. W. Nelson, 18 miles southwest of city of Oaxaca, altitude 7,500–9,500 feet, 10 to 20 September, 1894, no. 1364; also by C. G. Pringle, Sierra de Clavellinas, altitude 9,000 feet, 27 October, 1894, no. 5807; and by L. C. Smith, on mountains of Telixtlahuaca, altitude 7,500 feet, 27 July, 1895, no. 481.

Flaveria vaginata. Perennial with stout lignescent root: stems several, ascending from a decumbent or even prostrate somewhat-branched base, terete, striated, purplish, with bilineate short grayish woolly pubescence, leafy above, naked below except for the persistent and sheathing bases of the fallen leaves: internodes very short: leaves linear-subulate, clasping at the base, very gradually attenuate, often fascicled in the axils 1(–3)-nerved, rather pale green, finely ciliated toward the base: heads small, closely aggregated into terminal solitary or corymbose-paniculate glomerules; these simulating the normal involucrate heads of the order: glomerules 6 to 8 lines in breadth, subtended by a few short recurved foliaceous bracts, and containing 30 or more heads: involucral scales 3 to 4 in each head, hyaline: ray-flower solitary, conspicuous, 2½ lines long, with oblong slightly 2–3-toothed yellow ligule: disk-flowers 5 to 7, yellow: achenes black, lucid, about 10-nerved. — Collected by E. W. Nelson between Coixtlahuaca and Tamazulapam, Oaxaca, altitude 7,000 to 7,700 feet, 12 November, 1894, no. 1933.

Florestina pedata, Cass. With this species, *Schkuhria glomerata*, Rob. & Seaton, based on Mr. Pringle's nos. 4289 and 5006, and published in Proc. Am. Acad. xxviii. 109, is identical.

Florestina platyphylla. Mr. Pringle's no. 4975, collected on Monte Alban, Oaxaca, and described in the Am. Jour. Sci. ser. 3, L. 156, as *Schukhria platyphylla*, appears upon further examination to be better placed in *Florestina*.

Dysodia serratifolia, DC. A specimen collected by L. C. Smith, below Jayacatlan, at 3,500 feet altitude, 9 February, 1895, corresponds with Ghiesbreght's no. 519, and with a fragment of the type from the De Candollean Herbarium, in all respects, except in having the leaves mostly alternate, not opposite as hitherto described. The uppermost only are subopposite.

Liabum glabrum, Hemsl. (Biol. Cent.-Am. Bot. ii. 232). This showy species, originally collected by Bourgeau, no. 1401, at Cuernavaca, in 1865, has now been rediscovered by Mr. Pringle in the same locality. His excellent specimens show the flowers to be bright orange-yellow and the leaves normally attenuate. Mr. Pringle notes that the plant attains a height of 15 feet.

Liabum Pringlei. Half shrub, 3 or 4 feet high: stems terete, fuscous-tomentulose: leaves opposite, ovate, acute, mucronulate-denticulate, green and puberulent above, densely white-tomentose and reticulated with brownish veins below, rounded and 3-nerved at the base, 3 inches long, two thirds as broad; margins revolute; naked petioles but 2 lines long: heads few, large, $1\frac{1}{4}$ inches in diameter, discoid: involucre campanulate, multiseriate; scales pale brown (in dried state), lanceolate, attenuate, slightly sericeous: flowers about 75 in a head, yellow, 10 lines in length: achenes $2\frac{1}{2}$ lines long, sericeous: pappus of elongated straminеous bristles and very short outer scales. — Collected by C. G. Pringle, on mountains near Lake Chapala, Jalisco, altitude 7,000 feet, 18 October, 1895, no. 6215.

Cacalia peltata, HBK., var. Conzattii. Stem 1 to 3 feet high: inflorescence lax, 1–20-headed; heads 25–40-flowered; involucre 12-phyllous; calyculate, scales covered with a densely spreading pubescence. — Collected by Professor C. Conzatti on the Sierra de San Felipe, Oaxaca, altitude 9,000 feet, 29 November, 1895, no. 27; also by C. G. Pringle in the same region, altitude 10,000 feet, 13 December, 1895, no. 6238.

Senecio prionopterus. Erect herb, 1 to 3 feet in height: stems somewhat flexuous, green, striate, slightly flocculose, rather broadly and interruptedly winged by the decurrent bases of the leaves, simple to the corymbose-paniculate flat-topped inflorescence: leaves lance-oblong, attenuate to a very sharp narrow apex, irregularly serrate-dentate, half inch

broad, 3 or 4 inches long, glabrate above, floccose-tomentulose beneath, not narrowed at the base but decurrent upon the stem for nearly two inches in two broad wings, these sharply toothed especially near the lower end: bracts lance-linear: pedicels spreading, 4 to 15 lines in length, bearing several subulate bractlets: heads about 50, erect, half inch long and including the 8 or 10 spreading oblong golden-yellow rays, about 9 lines in diameter: involucre calyculate, about 20-phyllous; scales attenuate; disk-flowers 40 to 45, shortly 5-dentate: ligules 3 to 3½ lines long, 1 to 1½ lines broad, 4-nerved. — Collected by C. G. Pringle, on hills, at Las Sedas, Oaxaca, altitude 6,000 feet, 3 December, 1895, no. 6282.

Gochnatia Smithii. Shrub? leaves clustered near the ends of the branches, oblong, entire, obtuse, cuneate at the base, thickish, grayish and covered with a very fine short tomentum above (perhaps later glabrescent), much paler, tomentose and veiny beneath: heads in numerous slender close terminal globose glomerules, 8 lines long, about 6-flowered; involucres green, very slender, and gradually turbinate; the scales in many (8 to 10) series, extending as it were down upon the pedicels, ovate to lanceolate, obtuse, pubescent: style-branches short, flattened, rounded: divisions of the corolla subequal, narrow: achene subvillous, 1½ to 2 lines in length. — Collected by L. C. Smith, on hills of Cuicatlan, 30 April, 1895, at 3,000 feet altitude; also by E. W. Nelson along road from Totolapa to San Carlos, altitude 3,000 to 3,800 feet, April, 1895, no. 2546. Noteworthy for its very long slender closely imbricated involucres and globose inflorescences, the latter about 2 inches in diameter.

Perezia Cuernavacana. Glabrous: stems clustered, 2 to 3 feet high, striate-angulate, purplish, leafy: leaves oblong, obtuse and mucronulate at the apex, scarcely narrowed to the rounded subsessile base, sharply denticulate with pungent teeth, reticulated and lucidulous on both surfaces, 2 to 2½ inches long, 9 lines broad, ascending, imbricated, the uppermost gradually reduced: heads few, very large, about 30-flowered, 12 to 15 lines long and broad, terminal on long many-bracted peduncles: involucre turbinate, multiseriate; the scales greenish, silky-ciliate, the inner ones oblong, obtusish, 1½ to 2 lines broad near the summit, the outer gradually smaller and extending as subulate spreading bracts some distance down the peduncle: corollas lilac in dried state, 9 lines in length: pappus tawny; achenes puberulent, 3½ lines long. — A handsome species collected by C. G. Pringle, at Cuernavaca, altitude 7,000 feet, no. 6196.

Perezia umbratilis. Habit of *P. nudicaulis:* root horizontal, sending off numerous stout fibres; caudex multicipital, tufted with sordid

white wool: leaves all radical, runcinately pinnatifid, glabrous or nearly so, petioled, thin, acutish; lobes 5 to 7, mucronulate-dentate: stems about a foot high, slender, dark colored, quite smooth, bearing a few scattered minute appressed subulate bracts and at the summit 2 or 3 heads on slender ascending branches: heads 9 lines long, about 18-flowered: scales of the involucre in 5 series, obtuse, flattish (not thickened nor firm in texture), dark colored, ciliated, otherwise glabrous, the inner ones 5 lines long: flowers lilac in dried state, 7 to 8 lines long (including the achenes). — Collected by C. G. Pringle, in shade, at Tomellin Cañon, Oaxaca, altitude 3,000 feet, 1 December, 1895, no. 5966. Closely related to *P. nudicaulis*, Gray, but having a more numerously seriate involucre with thinner flatter scales, and flowers nearly twice as large.

SONCHUS ASPER, Vill. Although so generally distributed as a weed upon waste heaps, etc., this plant does not appear to have been noted in Mexican lists. It has been collected at San Diego, Chihuahua, by Hartman, and near the city of Oaxaca, by Nelson, no. 1353.

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Presented by B. L. Robinson, 14 April, 1897.

I. — REVISION OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF HOUSTONIA.

HOUSTONIA, Gronov. (Named in honor of Dr. William Houstoun, born in Scotland, 1695, died in Jamaica, 1733.) — Calyx-tube usually a little compressed; lobes 4, often with one or more minute teeth in each sinus, erect or spreading, persistent, later becoming widely separated. Corolla funnelform or salverform, 4-lobed, glabrous or pilose in the throat; lobes valvate. Stamens 4, inserted in the throat of the corolla; filaments short or elongated; anthers dorsally affixed, oblong or linear. Disk inconspicuous. Ovary 2-celled; style terete, slender, short or elongated; stigmas 2, linear or linear-oblong; ovules in each cell few or many, centrally attached to the median placenta. Capsule $\frac{1}{4}$ to $\frac{3}{4}$ inferior, more or less subglobose, obovate, obovate-oblong, or turbinate; seeds crateriform, acetabuliform, or oblong, peltate and slightly concave on the hilar surface, usually scrobiculate; albumen horny; embryo clavate. — Gronov. in L. Syst. Nat. ed. 1; L. Gen. no. 70; Benth. & Hook. f. Gen. ii. 60; Gray, Syn. Fl. N. A. i. pt. 2, 24; Schumann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 4, 27. *Poiretia*, Gmel. Syst. 263. *Panetos*, Raf. Ann. Gen. Sci. Phys. v. 227, vi. 81. *Chamisma*, Raf. in Steud. Nom. ed. 2, i. 776, in syn. — Low slender annuals, herbaceous perennials, or suffruticose plants with reciprocally dimorphous flowers.

§ 1. Euhoustonieæ. Low herbaceous plants often much branched from a woody perennial base: leaves ovate, oblong, linear or subterete, not rigid-setaceous nor acerose-linear: capsule globose, obovate, or oblong-obovate, more or less compressed and usually emarginate: seeds crateriform, acetabuliform, or oblong, peltate and slightly concave on the hilar surface, scrobiculate. — Gray, Proc. Am. Acad. iv. 313.

* Low slender creeping or erect annuals or perennials: flowers usually small on axillary or terminal pedicels or disposed in terminal cymes: capsule obcordate-depressed or oblong, emarginate, one half to three fourths inferior; seeds deep-crateriform, open-crateriform, or oblong, peltate and slightly concave on the hilar surface, usually scrobiculate.

+ Perennial by filiform rootstocks or creeping stems: flowers axillary or on slender terminal pedicels.

H. CÆRULEA, L., Sp. Pl. i. 105, accredited to Mexico by Hemsley (Biol. Centr.-Am. Bot. ii. 30), is essentially a more northern plant, and probably does not extend into Mexico.

H. serpyllacea, C. L. Smith, in herb. A low prostrate or creeping perennial: stems quadrangular, suffrutescent: branches ascending, 3 to 5 cm. high, glabrous: leaves elliptic-ovate, short-petiolate, acute, glabrous on either surface, margin revolute, hispidulous; stipules 1–2-long-setiferous with several shorter glandular setæ: flowers on short axillary pedicels: calyx-divisions lanceolate, acute, somewhat foliaceous, 2 to 4 mm. long; corolla funnelform, about 1 cm. long; lobes above and the throat pubescent: capsule oblong-obovate, 4 mm. long, one half as broad, about three fourths inferior; seeds (6 or more) oblong-rotund or a little oblique, peltate, slightly concavo-convex, prominently scrobiculate. — *Hedyotis serpyllacea*, Schlecht. Linnæa, ix. 599. *Mallastoma Shannoni*, Donnell Smith, Bot. Gaz. xviii. 203. — Jalapa, Schiede; C. L. Smith at Cruz Verde near Jalapa, altitude 2,150 m., no. 1486; Chiapas, Ghiesbreght, no. 814; Guatemala at San Miguel Uspantan, Depart. Quiché, altitude 2,150 m., Heyde and Lux (no. 3176 of Donnell Smith's sets).

+ + Delicate annuals with minute white flowers and erect or spreading corolla-lobes; seeds open-crateriform, oblong-rotund with a short hilar ridge.

H. croftiæ, Britton & Rusby. A depressed annual: stems 1 to 2 cm. long, hirtellous with a few scattered hairs, especially near the nodes: leaves oblanceolate, 5 to 15 mm. long, glabrous or with a few scattered hirsutish hairs on the midrib above, margins revolute, ciliate: stipules scarious, laciniate-dentate: flowers minute on short axillary pedicels: calyx including the ovary 2 mm. long, hirsute-pubescent; lobes acute: corolla white, 3 mm. long; lobes above short-pubescent: capsule depressed-globose, subdidymous, about one fourth inferior, the free portion short-hirsute-pubescent: seeds open-crateriform, oblong-rotund with a short hilar ridge. — Trans. N. Y. Acad. Sci. vii. 10. — San Diego, Duval Co., Texas, Miss Mary B. Croft, no. 85.

H. parviflora, Holzinger, in litt. A low annual, branching from a single slender root: branches ascending, quadrangular, minutely hispidu-

lous upon the angles: lower leaves oblanceolate; upper gradually narrowed to linear, 7 to 17 mm. long: stipules broadly ovate, scarious, minutely denticulate: flowers minute in the axils near the ends of the branches: pedicels 1 to 6 mm. long: calyx glabrous; lobes linear-oblong, acutish, spreading or recurved, 1½ to 2 mm. long: corolla white, equalling or slightly exceeding the lobes of the calyx; lobes erect, glabrous, about equalling the tube: capsule three fourths inferior; seeds open-crateriform, oblong-rotund, with a median hilar ridge. — Collected by J. E. Bodin, Round Rock, Texas, 10 March, 1890, no. 24.

+ + + Erect or low-spreading herbaceous perennials, 1 to 4 dm. high: leaves linear, linear-oblong, or ovate: inflorescence in terminal cymes: capsule obcordate-compressed, or oblong and a little nerved below, one half to three fourths inferior.

++ Erect herbaceous perennials: divisions of the calyx acute.

H. PURPUREA, L., Sp. Pl. i. 105, attributed to Mexico by Hemsley (Biol. Centr.-Am. Bot. ii. 30), apparently does not extend so far south. Gregg's no. 66, cited by Hemsley under the above species, is *Houstonia angustifolia*, Michx., var. *rigidiuscula*, Gray.

H. angustifolia, Michx. Erect, usually much branched from a woody perennial base: stems strict, quadrangular, glabrous: leaves linear to oblanceolate-linear, 1 to 5 cm. long, 1 to 5 mm. broad, often hispidulous upon the recurved margins and upon the midrib above: inflorescence cymose, corymbosely or paniculately branched; pedicels slender, erect, 2 to 8 mm. long: flowers dimorphous: calyx-lobes 1 to 1½ mm. long, acute: corolla somewhat funnelform, about 6 mm. long; tube pubescent within; lobes pubescent above: capsule oblong-obovate, about three fourths inferior, the free portion usually a little exceeded by the persistent calyx-lobes; seeds slightly concavo-convex, distinctly scrobiculate. — Fl. i. 85; Gray, Syn. Fl. N. A. i. pt. 2, 26. *Hedyotis stenophylla*, Torr. & Gray, Fl. ii. 41. *Oldenlandia angustifolia*, Gray, Pl. Wright. ii. 68. — Northern Mexico, Texas, northward to Iowa and eastward to Florida. Mexico, Pringle, no. 2260; Texas, Lindheimer, no. 620; Berlandier, nos. 432, 681, 1062, 2413, 2560, etc.; Wright, nos. 239, 240, 1390; E. Hall, no. 285; Palmer, no. 396; Heller, no. 1661. Thurber's specimen, without number, collected at Indianola, seems to be a depauperate form of this species.

Var. filifolia, Gray. Stems profusely branched; leaves linear-filiform: capsule somewhat smaller. — Syn. Fl. N. A. i. pt. 2, 27. *Oldenlandia angustifolia*, Michx., var. *filifolia*, Chapm. Fl. 181. — Texas, between Fredericksburg and San Sabra, Thurber, no. 67; Florida, at

Key West, Blodgett; also Curtiss, no. 1137. Drummond's no. 116, and Havard's nos. 231, 232, from Texas, are somewhat intermediate between the species and variety.

Var. scabra, Wats. Flowers short-pedicellate: calyx somewhat hirsute-scabrous: corolla-lobes near the apex externally covered with hirsute hairs (especially in bud): capsule rather larger than in the species. — Proc. Am. Acad. xviii. 97. — Caracol Mountains, Coahuila, Palmer, no. 410; Monterey, Nueva Leon, Palmer, no. 2116.

Var. rigidiuscula, Gray. From 1 to 3 cm. high: leaves linear to linear-oblong, 1 to 2 cm. long, 1 to 5 mm. broad, rather rigid: pedicels somewhat shorter than in the species proper: calyx-divisions usually exceeding the free portion of the capsule. — Syn. Fl. N. A. i. pt. 2, 27, in part. — Carneras Pass, Coahuila, Pringle, no. 2855; Gregg, no. 66; Valley of San Luis Potosi, Schaffner, no. 614; Texas, Guadalupe Mountains, Havard, no. 233; Rio Brassos, Drummond, no. 73 (Florida, Rugel, no. 322, from Dr. Gray).

H. rupicola. Low, profusely branching from a woody perennial base: stems erect, 8 to 14 cm. high, 4-angled, glabrous: leaves linear, 5 to 15 mm. long, acute or submucronate, rather rigid: stipules triangular, acute or short acuminate, usually unequally setiferous-denticulate: flowers dimorphous, sessile or short-pedicelled, disposed in small cymules terminating the stems and branches: calyx-divisions small, acute, scarcely 1 mm. long: corolla narrowly funnelform, about 5 mm. long; lobes pubescent above: capsule globose, 1½ mm. or less in length, about one half inferior; seeds oblong, peltate, slightly concave on the hilar surface, scrobiculate. — *H. fasciculata*, Gray, Syn. Fl. N. A. i. pt. 2, 27, as to plant Wright. *Hedyotis* (*Amphiotis*) *stenophylla*, var. *parviflora*, Gray, Pl. Wright. i. 81. — Crevices of rocks on the San Pedro River, Arizona, Wright, no. 238.

++ ++ Low, branching from the base: stems spreading or prostrate: divisions of the calyx obtuse.

H. salina, Heller. Low, spreading or prostrate: stems 8 to 10 cm. long, branching from a woody perennial base, glabrous: leaves oblong-linear, 5 to 15 mm. long, 2 to 5 mm. broad, essentially glabrous, margin volute: inflorescence in close subcapitate cymules terminating the stems and branches: flowers dimorphous: calyx-lobes short, scarcely 1 mm. long, obtusish, glabrous or hirtellous: corolla funnelform, 5 mm. long, pubescent in the throat; lobes pubescent above: capsule short-oblong, a little narrowed below, about three fourths inferior, the free portion about equalling the calyx-lobes; seeds as in the preceding species. — Contrib. Herb. Frank. & Marsh. Coll. no. 1, 96. *Houstonia*

angustifolia, Michx., var. *rigidiuscula*, Gray, Syn. Fl. N. A. i. pt. 2, 27, in part. — Corpus Christi, Texas, Palmer, without number, collected in 1879; Heller, no. 1812.

* * Low-tufted leafy species, 2 to 12 cm. high: pedicels reflexed in fruit: capsule one fourth inferior; seeds open-crateriform, oblong-rotund, with a median longitudinal ridge on the hilar surface.

+ Distinctly perennial, multicipital from a deep ligneous root.

H. Wrightii, Gray. Stems quadrangular, pruinose-puberulent: leaves linear or the lower narrowly spatulate, thickish, glabrous; stipules rather pronounced, broadly deltoid, entire or minutely denticulate: flowers dimorphous, 5 to 7 mm. long, in terminal leafy cymes: calyx-divisions lance-linear, acute, 1½ to 2 mm. long, glabrous: corolla salver-shaped; tube 2½ to 4 mm. long (depending upon the long- or short-styled form respectively), slightly enlarged above: seeds scrobiculate. — Proc. Am. Acad. xvii. 202, & Syn. Fl. N. A. i. pt. 2, 26. *H. humifusa*, Hemsl. Biol. Centr.-Am. Bot. ii. 30, not Gray. *Hedyotis* (*Houstonia*) *humifusa*, Gray, Pl. Wright. i. 82. *Oldenlandia* (*Houstonia*) *humifusa*, Gray, Pl. Wright. ii. 68, excl. syn. — State of Mexico, in meadows on the Sierra de las Cruces, elevation 3,000 m., Pringle, no. 5744; on the Serrania de Ajusco, altitude 3,000 m., Pringle, no. 6468; San Luis Potosi, elevation 1,800 to 2,460 m., Parry & Palmer, no. 301; in the vicinity of the city of Durango, Palmer, no. 312; Chihuahua, on the summits of Sierra Madre, Pringle, no. 2284; and on dry mountain sides, Chuchuichupa, in the same State by C. V. Hartman, no. 705; New Mexico, Wright, no. 241, Thurber, nos. 717, 1121; Santa Magdalena Mountains, Vasey; near Santa Rita del Cobre, E. L. Greene; Arizona, at Fort Whipple, Coues & Palmer, no. 75; in the San Francisco Mountains near Clifton, E. L. Greene; Prescott, Dr. Smart, no. 460; Lemmon, nos. 2726, 512, 512½; in the Rincon and Santa Rita Mountains, Pringle; at Willow Spring, Palmer, no. 523.

H. rubra, Cav. Much depressed, rather dense, 2 to 10 cm. high: stems and leaves hispidulous or nearly glabrous: leaves linear, or the lower oblanceolate-linear, 5 to 25 mm. long; stipules short with one or more setæ: flowers 1½ to 2½ cm. long, axillary: calyx-divisions linear, acute, in anthesis 2 mm. long, in fruit somewhat elongated: corolla red or purple varying to white; tube slender: capsule depressed, subrotund; seeds scrobiculate. — Ic. v. 48, t. 474, f. 1; Benth. Pl. Hartw. 15; Hemsl. Biol. Centr.-Am. Bot. ii. 30; Gray, Syn. Fl. N. A. i. pt. 2, 25. *Oldenlandia* (*Houstonia*) *rubra*, Gray, Pl. Wright. ii. 68. — Aguas Calientes, Hartweg, no. 93; Valley of San Luis Potosi, Schaffner,

no. 26; region of San Luis Potosi, altitude 1,800 to 2,460 m., Parry & Palmer, no. 300; hills and plains near Chihuahua, Pringle, no. 274; Sonora, south of San Luis, Parry, no. 6; Thurber, nos. 319, 707; without locality, Coulter, no. 196; New Mexico, Fendler, no. 291, Wright, no. 1119, Palmer, no. 93; Arizona, Wolf & Rothrock, no. 865; in the Huachuca Mountains, Lemmon, no. 2725, at Bisbee, F. E. Lloyd.

+ + Distinctly annual: stems dichotomously branched: corolla funnelform.

H. humifusa, Gray. A low annual: stems dichotomously branched, hispidulous: leaves linear or the lower oblanceolate, 1 to 1½ cm. long, 1 to 5 mm. broad, mucronate, hispidulous above, margins revolute: stipules broad, scarious, and setiferous: flowers axillary, rather numerous above: calyx-divisions setaceous-subulate, 3 to 4 mm. long: corolla open-funnelform, 6 to 7 mm. long; lobes pubescent above: pedicels strongly recurved in fruit: capsule depressed-globose, subdidymous. — Proc. Am. Acad. iv. 314. *Hedyotis* (*Houstonia*) *humifusa*, Gray, Pl. Lindh. ii. 216. — New Mexico, Thurber, no. 292; Texas, Lindheimer, nos. 621, 622, 377, 378; E. Hall, no. 286; on sandy prairies near Austin, Wright; Belknap, Sutton Hayes, no. 333; Colorado City, Reverchon, no. 60; on sandy hills and plains near Sweetwater, Curtiss, no. 1140; also specimen cultivated in the Cambridge Botanic Garden in 1849.

* * * A low slender leafy stemmed annual, with small white flowers on spreading axillary pedicels: capsule three fourths inferior.

H. subviscosa, Gray. A delicate herb, 4 to 15 cm. high: stems branched from the base: branches spreading, covered with a subviscid hirtellous pubescence: leaves linear-filiform, 5 to 15 mm. long, glabrous or hirtellous: stipules short, scarious, minutely setulose-ciliate: pedicels filiform, 3 to 8 mm. long, horizontally spreading but scarcely reflexed in fruit: calyx hirtellous-pubescent; divisions acute, about 1 mm. long: corolla salverform, about 3 mm. long: capsule subdidymous, broader than long; seeds open-crateriform, minutely scrobiculate. — Proc. Am. Acad. iv. 314. — *Oldenlandia subviscosa*, Wright in Gray, Pl. Wright. ii. 68. — Southern Texas, Berlandier, nos. 991, 2421, and Wright, without number.

* * * * Slender diffuse herbs, or perennials, 5 to 25 cm. high: stems more or less dichotomously branched, often becoming slightly woody below: leaves linear, subterete or filiform, shorter than the internodes: pedicels erect or spreading in fruit.

+ Low delicate annuals: calyx adnate nearly to the top of the ovary: capsule clavate-turbinate or subglobose.

H. Brandegeana, Rose. Erect or ascending, 5 to 10 cm. high, freely branching from the base: stems filiform, hispidulous-puberulent:

basal leaves narrowly spatulate, 5 to 8 mm. long; the upper gradually narrowed, hispidulous-puberulent above, glabrous beneath: pedicels elongated, filiform: flowers small, 4 to 6 mm. long: calyx-divisions short, scarcely 1 mm. in length, obtuse: corolla funnelform: capsule subglobose, $1\frac{1}{2}$ mm. long. — Contrib. U. S. Nat. Herb. i. 70. — Lower California, La Paz, Palmer, no. 31.

H. asperuloides, Gray. Much branched from the base, 5 to 18 cm. high: branches divaricately spreading and ascending, inconspicuously hispidulous-puberulent or quite glabrous: leaves linear or a little dilated above the middle, 5 to 24 mm. long, glabrous: flowers on slender filiform pedicels: calyx-lobes lance-linear, $1\frac{1}{2}$ to 2 mm. long, acute, slightly unequal: corolla funnelform, about 8 mm. long; tube below puberulent on either surface: capsule clavate-turbinate, tapering below; seeds oblong, peltate, somewhat concavo-convex, minutely scrobiculate. — Proc. Am. Acad. v. 158; Rose, Contrib. U. S. Nat. Herb. i. 70. *Hedyotis* (*Ericotis*) *asperuloides*, Benth. Bot. Sulph. 19, t. 13. — Lower California, Cape St. Lucas, Xantus, no. 43; at La Paz, Palmer, nos. 24, 31[a]; and by Brandegee, 5 February, 1890, the latter distributed as *Houstonia Brandegeana*, Rose.

H. arenaria, Rose. Erect or ascending, glabrous throughout: stems much branched: upper leaves linear or linear-lanceolate, $1\frac{1}{2}$ to 2 cm. long: stipules short, scarious, laciniate: inflorescence in loose terminal dichotomous cymes with the terminal flower sessile: calyx-lobes about 1 mm. long, obtusish, inconspicuously serrulate on the margins: corolla about 4 mm. long, funnelform; lobes spreading, broadly ovate: capsule obcordate-compressed, $1\frac{1}{2}$ mm. long; seeds oblong, peltate, slightly concavo-convex, scrobiculate. — Contrib. U. S. Nat. Herb. i. 70. — Lower California, La Paz, Palmer, no. 28; San Jose del Cabo, Brandegee, no. 261.

+ + Low dichotomously branched perennials: stems becoming slightly woody below: ovary one half to three fourths inferior: capsule short-oblong or subglobose.

++ Stems rather leafy: capsule about 3 mm. long.

H. Palmeri, Gray. Erect, profusely branched: branches hirtellous-puberulent or glabrous: leaves linear-filiform, glabrous, 5 to 18 mm. long; stipules small, subtruncate, minutely dentate, or triangular-acute: pedicels slender, erect or ascending: flowers about 1 cm. long, dimorphous: calyx-divisions lance-linear, 2 mm. long, ciliate: corolla salver-shaped or slightly funnelform, upper portion of tube pubescent within: free portion of capsule often hirtellous; seeds open-crateriform, oblong-

rotund with a longitudinal hilar ridge on the ventral surface, scrobiculate. — Proc. Am. Acad. xvii. 202. — Northern Mexico, Coahuila, in the region of Saltillo, Palmer, nos. 397, 398, and in the same State on limestone hills, Carneros Pass, Pringle, no. 2381.

++ ++ Leaves much reduced: capsule about 2 mm. long.

H. longipes, Watson. Erect, much branched, 1 to $2\frac{1}{2}$ dm. high: stems and branches subterete, slender, glabrous or below granular-hirtellous: leaves linear-filiform, 4 to 10 mm. long, glabrous; stipules minute: flowers small, "whitish and yellowish," 8 mm. long, on slender filiform pedicels: calyx-divisions linear, about 1 mm. long, obtusish and submucronate: corolla funnelform, upper portion of tube pubescent within; lobes pilose-pubescent above: capsule small, subrotund; seeds saucer-like or subcrateriform with a longitudinal ridge on the hilar surface, scrobiculate. — Proc. Am. Acad. xviii. 97. — Near Monclova, Coahuila, Palmer, no. 394, and by the same collector at Monterey, Nueva Leon, no. 395; also by Dr. Gregg at Cerralbo, collected 29 May, 1847.

H. brevipes, Rose. A low much branched distinctly suffrutescent plant, 2 to 3 dm. high, glabrous throughout, somewhat glaucous: branches slender, terete: leaves linear-filiform, 10 to 15 mm. long; stipules short, 1–4-setiform: flowers sessile or on slender pedicels: calyx deeply 4-lobed, with a stipitate gland in each sinus: divisions in anthesis about 1 mm. long: corolla salverform, 10 to 15 mm. long; tube slender, slightly enlarged above; lobes glabrous above: capsule subglobose; seeds oblong, peltate, cancavo-convex, minutely scrobiculate. — Contrib. U. S. Nat. Herb. i. 83, 132. — Lower California, Santa Rosalia, Palmer, no. 202; Carmen Island, Palmer, no. 836; also specimen in Gray Herbarium from Lower California, apparently from the herbarium of Dewey, without further data.

§ 2. Ereicotis. Fruticose or fruticulose plants with linear subterete rigid-setaceous or acerose-linear leaves: capsule short-oblong, obtuse or retuse; seeds open-crateriform or oblong, peltate, minutely scrobiculate. — Gray, Proc. Am. Acad. xvii. 203.

* Low, 2 to 18 cm. high, much branched from a woody perennial base: leaves rigid-setaceous or acerose-linear.

H. acerosa, Gray. A low diminutive cespitose shrub: branches ascending or erect, strict, striate, hispidulous: leaves opposite or in threes or fours, 5 to 12 mm. long, connected at the base by a stipular setiferous cup, more or less hispid and ciliate: flowers sessile at the ends of the branches and branchlets: calyx deeply 4-parted; divisions setaceous, 4 mm. long, hispidulous: corolla-tube slender, about 1 cm. long, dilated

at the throat, almost funnelform: capsule about two thirds inferior, globose or short-oblong, obtuse or slightly retuse, pubescent, much exceeded by the erect persistent calyx-divisions; seeds more or less crateriform, somewhat roughened on the back. — Proc. Am. Acad. xvii. 203, & Syn. Fl. N. A. i. pt. 2, 27; Hemsl. Biol. Centr.-Am. Bot. iv. 47. *Hedyotis* (*Ereicotis*) *acerosa*, Gray, Pl. Wright. i. 81. *Oldenlandia* (*Ereicotis*) *acerosa*, Gray, Pl. Wright. ii. 67. *Mallostoma acerosa*, Hemsl. Biol. Centr.-Am. Bot. ii. 31. — Northern Mexico, Parry, nos. 7, 302, Gregg, no. 72, Palmer, nos. 400, 401, 402, 403; adjacent Texas, Wright, nos. 237 (type), 1118, Thurber, no. 91, and Bigelow.

H. polypremoides, Gray. Low, cespitose, 6 to 15 cm. high, much branched from a woody perennial base: stems strict, ascending or erect, usually branched above, glabrous or densely hirtellous-puberulent: leaves less fascicled than in the preceding species, acerose-linear, 5 to 10 mm. long, glabrous or hirtellous, margin revolute, often ciliate, midrib thickened: flowers dimorphous, sessile or distinctly pedicellate, terminating the stems and branches; pedicels elongated in fruit, reaching a length of 13 mm.: calyx-divisions awl-shaped, 3 to 4 mm. long: corolla salverform or slightly funnelform, "white changing to purple," 8 to 10 mm. long: capsule globose, about two thirds inferior; seeds open-crateriform, oblong-rotund with a short hilar ridge. — Proc. Am. Acad. xxi. 379. — Chihuahua, Santa Eulalia Mountains, Pringle, nos. 16, 356; on route from Leavenworth to El Paso, F. R. Diffenderffer; at junction of Delaware Creek and Pecos River, Texas, Pope.

Var. Bigelovii. A form with the calyx-lobes $1\frac{1}{2}$ to 2 mm. long, otherwise as in the type. — Florence Mountains, Bigelow, in the Mexican Boundary Survey, June, 1852, no. 437.

* * Distinctly shrubby, $2\frac{1}{2}$ dm. or more high, much branched: leaves thickish, more or less fascicled: inflorescence in cymes terminating the stems and branches.

+ Leaves 3 to 10 mm. in length, much fascicled: corolla 3 to 4 mm. long.

H. fasciculata, Gray. A low bushy shrub, much branched: stem and branches covered with a grayish bark: branchlets tetragonal, hirtellous-puberulent: leaves linear, subterete, thick, rigid, nearly equalling the internodes, decidedly fascicled in the axils, glabrous or hirtellous, margin revolute; stipules short, scarious, 1 to 3 setiferous-dentate: cymes few-flowered: flowers small, "white, drying purple," dimorphous: calyx-divisions short, about 1 mm. long, obtuse, usually puberulent: corolla deeply 5-lobed; lobes recurved; tube long-pilose-pubescent on the inner surface: capsule oblong; seeds oblong, peltate, concavo-convex, minutely

scrobiculate. — Proc. Am. Acad. xvii. 203. — In the mountains, 24 miles N. E. of Monclova, Coahuila, Palmer, nos. 404, 406; Santa Eulalia Mountains, Chihuahua, Pringle, nos. 151, 354; adjacent Texas, at Presidio, Bigelow, in Mexican Boundary Survey; foothills of Chisos Mountains, Havard, No. 31; and in the Organ Mountains, New Mexico, Vasey, 1881.

+ + Leaves 3 to 18 mm. in length: corolla 10 to 14 mm. long.

H. fruticosa, Rose. Low much branched shrub, glabrous throughout: stem and branches covered with a rough yellowish brown or grayish bark: leaves linear or somewhat thickened and subterete, submucronate, more or less fascicled in the axils; stipules short, glandular-setiferous: inflorescence in terminal rather few-flowered dichotomous cymes; flowers subsessile or short pedicellate: calyx deeply 5-lobed with a single stipitate gland in each sinus; lobes linear-lanceolate, about 3 mm. long, foliaceous: corolla about 3 times longer than the calyx; tube narrowly funnel-shaped, glabrous: capsule short, oblong, subtruncate or slightly emarginate; seeds oblong, peltate, concavo-convex, minutely scrobiculate. — Contrib. U. S. Nat. Herb. i. 132, 239. *Hedyotis* (*Ericotis*) *mucronata*, Benth. Bot. Sulph. 19. — Magdalena Island, Lower California, Brandegee, 17 January, 1889; Carmen Island, Palmer, no. 885.

§ 3. MACROHOUSTONIA. Erect shrubby plants with ovate leaves and rather large flowers. — Gray, Proc. Am. Acad. iv. 314. A section scarcely to be retained.

H. bouvardioides, Benth. & Hook. f. Shrub 3 to 4 feet high: stems terete, granular-puberulent: leaves opposite or ternate, short-petiolate, ovate or elliptic-lanceolate, acute or short-acuminate, entire, finely puberulent upon either surface, especially upon the midrib and veins: inflorescence in terminal compound minutely pubescent cymes: calyx deeply 4-parted; divisions linear, 3 mm. long: corolla funnelform, about 12 mm. long, glabrous, rather deeply 4-lobed; tube with a few scattered hairs on the inside toward the base; lobes oblong, obtuse: anthers long-exserted: style included (probably dimorphous); ovules rather numerous: seeds not seen. — Gen. ii. 60; Hemsl. Biol. Centr.-Am. Bot. ii. 30. *Hedyotis* (§ *Anotis*) *bouvardioides*, Seem. Bot. Herald, 296, t. 64. — N. W. Mexico, Seemann. A plant having much more in common with *Bouvardia* than with *Houstonia*, but without fruit or mature seeds it seems unwise to make the transfer. More complete specimens, however, may justify its removal to the former genus.

H. (MACROHOUSTONIA) LONGIFLORA, Gray, Proc. Am. Acad. iv. 314, Hemsl. Biol. Centr.-Am. Bot. ii. 30, is *Bouvardia longiflora*, HBK.,

Nov. Gen. & Spec. iii. 386; Bot. Mag. 4223. *Æginetia longiflora*, Cav. Ic. vi. 51, t. 257, f. 1.

H. (MACROHOUSTONIA) TRIFLORA, Gray, l. c., Hemsl. l. c., is a good *Bouvardia*.

From the technical characters of complete specimens of the last two species, now at hand, there seems no reason for retaining them in the genus *Houstonia*.

II. KEY TO THE MEXICAN SPECIES OF LIABUM.

* Leaves ovate or ovate-deltoid: heads radiate.

– Leaves ovate-deltoid, more or less deeply sinuate-dentate and mucronate-denticulate: heads few, large (3 to 5 cm. in diameter), terminating the stem.

L. Andrieuxii, Benth. & Hook. f. Gen. ii. 437. *Vernonia Andrieuxii*, DC. Prodr. v. 16.

– – Leaves ovate, entire or mucronate-denticulate: heads disposed in terminal panicles.

†† Pappus of slender unequal setæ, not biseriate.

= Involucral scales lance-attenuate: petioles winged and often dilated about the stem: ligules narrow: achenes pubescent.

L. asclepiadeum, Schz. Bip. Linnæa, xx. 521.

= = Involucral scales oblong, obtuse: ligules ovate: achenes glabrous.

L. polyanthum, Klatt, Bull. Soc. Bot. Belg. xxxi. (1892), 209.

†† †† Pappus distinctly biseriate, outer series short, paleaceous.

= Achenes pubescent.

L. andromachioides, Benth. & Hook. f. Gen. ii. 436. *Vernonia andromachioides*, Less. Linnæa, vi. 397, 645.

L. Deppeanum, Hemsl. Biol. Centr.-Am. Bot. ii. 232. *Andromachia Deppeana*, Less. Linnæa, vi. 401.

= = Achenes glabrous.

L. platylepis, Schz. Bip. Flora, 1856, 160; Klatt, Leopoldina, xxiii. (reprint, p. 7).

L. discolor, Benth. & Hook. f. Gen. ii. 436. *Sinclairia discolor*, Hook. & Arn. Bot. Beech. 433; Hook. Ic. Pl. v. t. 451.

* * Leaves ovate or ovate-lanceolate: heads discoid.

– Inflorescence in loose terminal pyramidal panicles: involucre 3–5-seriate: pappus biseriate.

†† Immature achenes stipitate-glandular: involucral scales obtuse.

L. glabrum, Hemsl. l. c.

Var. hypoleucum. Leaves ovate-oblong, acuminate, glabrous above, white-tomentose beneath, more or less glabrescent. — Collected by C. G. Pringle, in cañons near Guadalajara, 8 December, 1888, no. 2169, and on rocky banks of river below the Falls of Juanacatlan near Guadalajara, 25 October, 1889, no. 2372, the latter distributed as *Liabum discolor*, Benth. & Hook. f.

The companion number cited by Hemsley, Bourgeau, no. 1401, as represented in the Gray Herbarium, shows an arachnoid pubescence still adhering to the under surface of the leaves. Pringle's no. 2169 shows the tomentum on the lower surface of the leaves to be evanescent; this number, however, certainly represents the same species as Pringle's no. 2372, which has a dense tomentum on the lower surface of the leaves. It seems best therefore to regard these two specimens collected by Mr. Pringle as a tomentose variety of *Liabum glabrum*, Hemsl. Mr. Pringle's no. 6182, collected in the type locality, is probably more typical of the species proper.

++ ++ Involucral bracts acute: immature achenes setulose at the apex.

L. sericolepis, Hemsl. l. c.

+-+ Inflorescence in thyrsoid panicles, terminating the stems and branches: involucral scales lance-attenuate: pappus of unequal setæ, not biseriate.

L. Klattii, Rob. & Greenm. Am. Jour. Sci. ser. 3, L. 156.

+-+-+ Heads few, large, 2 cm. or more in diameter: involucre multiseriate; scales lanceolate, acute: petioles short, about 4 mm. in length.

L. Pringlei, Rob. & Greenm. Proc. Am. Acad. xxxii. 49.

* * * Leaves sessile, linear or palmately lobed: heads discoid, few, on long peduncles: involucral scales linear-attenuate: achenes sericeous.

+- Leaves amplexicaul, palmately lobed.

L. cervinum, Rob. Proc. Am. Acad. xxix. 317.
L. Palmeri, Gray, Proc. Am. Acad. xxii. 432.

+-+- Leaves linear, subverticillate.

L. angustissimum, Gray, l. c.

* * * * Species of doubtful affinity.

L. Liebmannii, Klatt, Leopoldina, xxiii. (reprint, p. 7). From the very meagre characterization of this species it is impossible to give its exact affinity without seeing Liebmann's specimen.

III. — DESCRIPTIONS OF NEW AND LITTLE KNOWN PLANTS FROM MEXICO.

Tradescantia macropoda. Roots tuberous, fascicled: stems erect or suberect, sparingly branched, bilineate-pubescent, otherwise glabrous or puberulent: leaves oblong-ovate, acute, 5 to 8 cm. long, $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. broad, abruptly narrowed below to an unequal base, glabrous or sometimes inconspicuously puberulent on either surface; margin, except at the ciliated base, hispidulous: sheaths 5 to 8 mm. long, puberulent, especially along the line of pubescence on the stem, strongly ciliate: inflorescence umbellate on rather long slender peduncles (2 to $4\frac{1}{2}$ cm. long): bracts orbicular-ovate, obtuse, glabrous, 5–7-nerved: flowers several, fugitive in the bracts; calyx-divisions oblong, navicular, thin or scarious, 1-nerved, 3 to 4 mm. long, one half as broad; the outer sepal often sparingly long hirsute-pubescent on the keel: corolla light purple in the dried state; petals about 6 mm. long, two thirds as broad: stamens 6, equal; filaments somewhat exceeding the corolla, rather scantily covered toward the base with multicellular hairs; anther-cells globose, equal, widely separated by a long narrow connective: ovary glabrous or with a few scattered glandular hairs at the apex: seeds light brown, transversely rugose. — Collected by C. G. Pringle, on moist banks of mountains above Cuernavaca, altitude 2,000 m., 3 August, 1896, no. 6402. A species nearly related to *T. commelinoides*, Rœm. & Schult., but readily separated by the nearly glabrous character throughout, and by the long slender glabrous peduncles.

Schœnocaulon Pringlei. Bulbs ovoid, 1 to 2 cm. in diameter: caudex erect, cylindrical, 3 to 10 cm. long, surrounded by a covering of dark brown fibres, the remnants of the bulb-scales and outer leaves: foliar leaves linear-attenuate, 1 to 5 dm. long, 2 to 6 mm. broad, 9–10-nerved, smooth on either surface, margin slightly roughened: naked scape $3\frac{1}{2}$ to 6 dm. high, terete or slightly flattened, smooth: inflorescence dense, 3 to 8 cm. long, 1 cm. broad: bracts broadly ovate, acute, scarious, $2\frac{1}{2}$ mm. long: divisions of the perianth oblong, about 4 mm. long, 3-nerved, obtuse or rounded at the slightly thickened apex, margins scarious, irregularly subdenticulate, or entire: stamens in anthesis about equal or slightly exceeding the divisions of the perianth (even in the later stages exceeding the perianth divisions by about 1 mm. only): immature capsules about 12 mm. long, erect, glabrous, rather dense, and somewhat appressed to the rhachis. — Collected by C. G. Pringle, on lava beds, Serrania de Ajusco, altitude 2,400 m., 23 August, 1896, no. 6415.

Agave (Euagave) collina. Acaulescent: leaves 30 to 40 in a rosette, linear-attenuate, 6 to 8 dm. long, 2 cm. broad just above the base, 2½ cm. broad at the middle, gradually narrowed to the apex and terminated by a reddish brown spine (2 cm. or more long), margin narrowly cartilaginous bearing reddish brown straight or curved teeth (3 to 5 mm. long) at intervals of 8 to 18 mm., upper surface concave, below convex, bluish green: peduncles 3 to 4 m. long: panicle 6 to 8 dm. long, the lower branches about 3 dm. long: flowers greenish yellow, including the stamens, 9 cm. long: tube of the perianth 1½ cm. long, funnel-shaped; segments linear-oblong, obtuse, thickened at the apex, about 2 cm. long: stamens more than twice as long as the perianth-segments; filaments flattened, glabrous, about 5 cm. long from the point of insertion; anthers 2½ to 3 cm. in length: style overtopped by the anthers: fruit a loculicidal capsule, 4½ to 5 cm. long, 2½ to 3 cm. in diameter; seeds obliquely triangular, about 1 cm. long. — Collected by C. G. Pringle, on hillsides near Cuernavaca, altitude 1,500 m., 1896, no. 6349. This may prove eventually to be identical with the imperfectly known species *A. serratula*, Karw., but as the flowers and fruit of the latter are unknown, and our plant does not agree in all details with the fragmentary description of Karwinski, it seems best to regard Mr. Pringle's plant as a distinct species.

Nemastylis cærulescens. Bulb ovoid, 1½ to 2 cm. in diameter, covered with dark brown scales: stem or scape 14 to 20 cm. high, branched above, bearing 1 to 3 pedunculate spathes: the outer radical leaves much reduced, the inner a single linear-attenuate leaf, 10 to 15 cm. long, usually exceeding the scape; stem leaves reduced to lance-attenuate bracts, 3 to 4½ cm. long, subtending the inflorescence or pedunculate spathes: peduncles 1 to 2½ cm. in length: bracts of the spathe linear-oblong, acuminate, the outer 2 to 3 cm. in length, the inner a little longer: pedicels slender, 2½ to 3½ cm. long: flowers white, sometimes with a faint shade of blue, 3½ to 4½ cm. in diameter, becoming reflexed; divisions of the perianth flabellate-nerved, hirtellous-puberulent above near the base, the outer oblong-elliptic, about 6 mm. broad, the inner somewhat smaller and a little narrowed toward the base: filaments united at the base, free portion flattened, about 2 mm. long; anthers 1 cm. in length, curling with age: capsule smooth, obovoid, subtruncate above, 7 to 10 mm. long, 5 to 7 mm. in diameter: seeds irregularly angled, yellowish, minutely pitted, 2 mm. long. — Collected by C. G. Pringle, on dry gravelly soil near Cuernavaca, altitude 1,600 m., June, 1896, no. 6324. A species most nearly related to *N. acuta*, Herb. (*N. geminiflora*, Nutt.), but a much smaller plant and with different flowers.

Bletia macristhmochila. Bulbs terrestrial, subglobose or somewhat gibbous: scape 6 to 6½ dm. high, surrounded at the base by 4 to 6 purplish striated acute sheaths, naked portion smooth, 1–2-vaginate, terminating above in a few-flowered raceme: leaves plicate, broadly lance-acuminate, smooth, about 7-nerved, 12 to 30 cm. long, 2 to 4 cm. wide: bracts triangular-acuminate, 10 to 14 mm. long: flowers 5 to 8 cm. in diameter, rose-purple in the dried state: sepals oblong, short-acuminate, a little narrowed at the base, 3 to 4 cm. long, 10 to 12 mm. broad: petals oblong, obtuse or rounded at the apex, rather abruptly narrowed below, considerably broader than the sepals; labellum deeply 3-lobed, lateral lobes broad and obtusely triangular, strongly flabellate-nerved, the upper nearly horizontal margins subcrenate, lateral margins entire, median lobe deeply obcordate, apiculate in the terminal sinus, the two spreading subcrenulate or erose lobes narrowed below, and connecting with the lateral lobes by a long narrow neck or isthmus; lamellæ 5, strongly undulate, continuous from near the apex almost to the base of the labellum: gynœcium narrowly winged, 2 to 2½ cm. long. — Collected by Dr. E. Palmer, on a barranca, near Guadalajara, June, 1886, no. 127, also by C. G. Pringle, in the same locality, 2 July, 1889, no. 2875. This plant has been confused with *B. campanulata*, Llav. & Lex., to which species it was referred by Dr. Sereno Watson. It may however be distinguished from *B. campanulata*, as well as from *B. fulgens*, Reichb., a large flowered species growing in similar localities, by the long narrow neck or isthmus of the labellum.

Microstylis streptopetala, Rob. & Greenm. Proc. Am. Acad. xxxii. 36. A large flowered form of this species was collected by C. G. Pringle, on lava beds, Serrania de Ajusco, at an elevation of 2,400 m., August, 1896, no. 6410. Except in the size of the flowers, which are about one third larger than in the type, the specimens agree in every detail with the above species.

Aristolochia longecaudata, Watson, var. virescens. Perennial from a ligneous base: stems decumbent or prostrate, sulcate, somewhat retrorsely hirsute-pubescent: leaves ovate to ovate-oblong, often acuminate, pubescent on either surface, 3–5-nerved, 3 to 9 cm. long, 1½ to 5½ cm. broad: petioles 1 to 3½ cm. long. — Collected by C. G. Pringle, about Cuernavaca, altitude 1,500 m., 23 July, 1896, no. 6383. A form differing from the type of the species by its larger thinner and less pubescent leaves, but having the same technical characters in flower and fruit.

Euphorbia ramosa, Seaton, var. villosior. Stems decumbent,

much branched from a suffrutescent base, rather densely covered with a spreading villous pubescence: involucre purple, glabrous: capsule pubescent. — Collected by C. G. Pringle, Pedrigal (lava beds), Valley of Mexico, altitude 2,300 m., 25 August, 1896, no. 6436.

Mentzelia Conzattii. Stems whitish, covered with a thin scarious bark, below glabrous, above pubescent: lower leaves subopposite, upper alternate, simple, including the petioles 5 to 14 cm. long, $1\frac{1}{2}$ to $3\frac{1}{2}$ cm. broad, oblong-lanceolate, acuminate, acute, finely dentate, gradually narrowed at the entire base into a short petiole, scabrous above, tomentose beneath, midrib somewhat depressed above, prominent beneath; petioles 4 to 12 mm. long: inflorescence cymose-paniculate: flowers large, about 5 cm. in diameter, showy: calyx deeply 5-lobed; tube turbinate, barbellate-pubescent; lobes lance-ovate, acuminate, 12 mm. long, 4 mm. broad at the base, pubescent: corolla pentapetalous; petals ovate-oblong, short-acuminate, a little narrowed at the base, $2\frac{1}{2}$ cm. long, 1 to $1\frac{1}{2}$ cm. broad, yellow in the dried state: stamens disposed in phalanges opposite the petals, the filaments of the 3 outer stamens of each phalanx somewhat flattened, the others filiform: style single, filiform; stigma terminal: mature fruit not seen. — Collected by C. Conzatti, Oaxaca, altitude 1,500 m., 5 January, 1896, no. 62.

Streptotrachelus, nov. gen. of *Apocynaceæ* (*Euechitideæ*). Calyx 5-parted, naked at the base within. Corolla salverform, coronate, esquamate, tube cylindrical not dilated at the throat, soon becoming strongly contorted at the middle; lobes 5, dextrorsely convolute in the bud, and sinistrorsely twisted. Stamens affixed to the upper half of the corolla-tube, included, free portion of the filament short; anthers sagittate, acuminate, connivent about the stigma, the cells projecting below into two rigid appendages. Disk of 5 oblong fleshy persistent scales about equalling the ovary. Ovary of two distinct carpels with a common filiform style; stigma fleshy, oblong-cylindrical, short-acuminate, somewhat 2-cleft at the apex, dilated at the base, adherent above and below to the anthers; ovules in each carpel numerous. Follicles subterete. Seeds oblong-linear, furrowed, not contracted into a beak at the coma-bearing apex; albumen scanty; cotyledons plane. Woody stemmed twining plants with opposite leaves and cymose inflorescence. The generic name is taken from στρεπτός, twisted, and τράχηλος, throat, in reference to the twisting of the corolla-tube.

Streptotrachelus Pringlei. Stems woody, more or less covered with lenticels, twining and clambering over shrubs and small trees to 4 or 6 meters; branchlets reddish brown, puberulent: leaves opposite, petio-

late, oblong-ovate to broadly ovate, 4 to 8 cm. long, 2 to 5 cm. broad, short-acuminate, entire, usually cordate at the base, finely pubescent upon either surface, especially upon the prominent midrib and the strongly reticulate veins beneath, above dark green, paler beneath: petioles canaliculate, 1 to 3 cm. long, puberulent or finely pubescent, bearing at their bases 2 or more small subulate stipule-like structures: inflorescence in axillary pedunculate minutely pubescent cymes; peduncle 2 cm. or more long; pedicels 1 to 1½ cm. long; calyx deeply 5-parted; divisions lance-linear, acute, about 4 mm. in length: corolla salverform, greenish yellow or sometimes purple; tube 22 mm. long, strongly contorted at the middle, provided at the orifice with an adnate subcuneate crown and bearing on the inside just above the attachment of the stamens a tuft of long villous hairs; lobes broadly obovate, 8 to 9 mm. long: anthers pubescent on the outer surface: carpels villous-pubescent: fruit reaching a length of 3 dm.; seeds about 2 cm. long. — Collected by C. G. Pringle, on lava beds near Cuernavaca, altitude 1,600 m., 23 September, 1896, no. 6554.

Astephanus pubescens. Stems slender, twining, finely striate, pubescent: leaves short-petiolate, lanceolate to ovate-lanceolate, 1½ to 6 cm. long, 4 to 20 mm. broad, acute at the apex or sometimes submucronate, obtuse at the base, entire, sparingly pubescent on either surface: petioles 2 to 4 mm. long, pubescent: inflorescence in subumbellate short-pedunculate several flowered axillary clusters; peduncles 1 to 2 mm. long: flowers on slender pubescent pedicels, the latter about 3 mm. in length: calyx minute, 5-parted, pubescent on the outer surface, provided on the inside with 5 small oblong glands alternating with the lobes: divisions ovate, acutish: corolla subcampanulate, about 3 mm. in diameter, deeply 5-lobed, white or tinged with brownish purple: lobes dextrorsely convolute in the bud, oblong, emarginate at the apex, spreading, later becoming somewhat reflexed, the upper inner surface, as well as the corolla-tube inside, granular or almost lepidote: fruit not seen. — Collected by C. G. Pringle, on a wet barranca above Cuernavaca, altitude 2,000 m., 21 September, 1896, no. 6507, and in the mountains near Cuernavaca, 3 August, 1896, no. 7203. A plant with the habit of *Metastelma*, or of *Vincetoxicum*, but by the entire absence of a crown, or at most by a very rudimentary one, its affinity is rather with the genus *Astephanus*, notwithstanding the presence of the minute glands at the sinuses on the inside of the calyx.

Gonolobus chrysanthus. Stems twining, greenish purple, granulose, interspersed with spreading or subreflexed hirsute pubescence: leaves ovate-oblong, acuminate, obtusish at the apex, a deep narrow open sinus

at the base with rounded basal lobes on either side, margin entire, finely ciliate, hirsute or hirsutish pubescent above, hirsute on the midrib and veins beneath, 5 to 9 cm. long, 2 to 4 cm. broad; petioles hirsute, 1 to 5 cm. long: inflorescence in axillary pedunculate subumbellate racemes, granulose or glandular, and interspersed with spreading hirsute hairs: peduncles 1 to 2 cm. long: bracts linear, subulate, hirsute: pedicels slender, 10 to 17 mm. long: buds oblong, oval, obtuse, pubescent: calyx-divisions oblong-linear, acutish, ciliate, hirsute on the outer surface, glabrous within, 3 to 4 mm. long, about 1 mm. broad: corolla $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. in diameter, orange yellow, or yellow streaked with parallel greenish veins, outer surface pubescent, inner surface glabrous; lobes oblong-linear, obtuse or rounded, usually oblique and often with a slight notch at the apex, 6 to 10 mm. long, about 3 mm. broad; crown 5-lobed, lobes denticulate. — Collected by C. G. Pringle, on hills near Patzcuaro, State of Michoacan, 3 August, 1892, no. 5277; on a wet wooded barranca above Cuernavaca, altitude 2,000 m., 4 August, 1896, no. 6373; Pedigral (lava beds), Valley of Mexico, altitude 2,500 m., 25 August, 1896, no. 6437.

Lithospermum (Batschia) oblongifolium. Herbaceous from a woody perennial base: stems erect, sparingly branched, $3\frac{1}{2}$ to 5 dm. high, covered with a spreading hirsute pubescence: leaves sessile, oblong or oblong-ovate, acute, entire, tuberculate-hispid above, with a scattered substrigose pubescence beneath (somewhat more dense upon the veins), 4 to $8\frac{1}{2}$ cm. long, $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. broad: flowers axillary, disposed in leafy one-sided racemes or scorpoid cymes, in fruit about 15 cm. in length: pedicels 4 to 8 mm. long: calyx deeply 5-parted, persistent; divisions linear, 1-nerved, hirsute-pubescent, 10 to 14 mm. long: corolla tubular, 5-lobed, gibbous at the throat, about 3 cm. long; tube pubescent on the outer surface, inner surface glabrous except along five lines in continuance with the short filaments; lobes erect, subreniform, 3 mm. long, 5 mm. broad: style filiform, glabrous, more or less persistent; stigma capitate-2-lobed: nutlets ovate, acute, smooth, white, or white below and brownish above. — Collected by C. G. Pringle, on the Serrania de Ajusco, altitude 3,000 m., 18 August, 1896, no. 6451. A species with the habit of *L. Palmeri*, Wats., but readily distinguished by the pubescence of the stem and by the characters of the corolla and stigma.

Citharexylum glabrum. A tree 6 to 8 m. in height, glabrous throughout: branches and branchlets subterete, striate, covered with a brownish bark: leaves oblong to oblong-lanceolate, 4 to 10 cm. long, 1 to 3 cm. broad, rounded, obtuse or acute at the apex, narrowed at the base

into a petiole (10 to 16 mm. long), punctate especially on the under surface, dark green above, paler beneath, glandular below on either side of the midrib at the base of the blade with 1 to 2 or 3 oblong-elliptic glands: inflorescence in terminal and axillary nodding spike-like racemes, 4½ to 11 cm. long; bracts minute, equal to or exceeding the pedicels, the latter about 1 mm. long, and jointed just below the flowers: calyx 2 mm. long, subtruncate, 5-nerved, somewhat 5-angled and ciliate: corolla about 5 mm. in length, tubular, 5-lobed, white or pinkish; tube broad, glabrous on the outer surface below, puberulent above, pubescent in the throat; lobes broad, oblong or rounded, pubescent on either surface: style glabrous. — Collected by C. G. Pringle, in the mountains near Lake Chapala, Jalisco, 16 December, 1889, no. 2442. Flowers fragrant. Distributed as *Gonzalea glabra*, Wats., n. sp., Proc. Am. Acad. xxv. 152.

Citharexylum ovatifolium. A soft woody shrub, 2 to 3 m. in height: branches tetragonal, minutely striate, pubescent: leaves membranaceous, ovate-acuminate, 8 to 12 cm. long, 3½ to 6½ cm. broad, obtuse, submucronate, abruptly narrowed at the base into a more or less winged pubescent petiole, entire or irregularly crenate-dentate, ciliate, pubescent upon either surface, dark green above, slightly paler beneath, usually provided with one or more large glands on the lower surface at the base of the blade on either side of the midrib: inflorescence in pubescent spike-like nodding or flexuous racemes, 5 to 12 cm. long, terminating the branches and branchlets: bracts about 1 mm. long, minute, subulate, equalling or slightly exceeding the short pubescent pedicels: calyx 3 mm. long, subtruncate or minutely and irregularly 5-dentate, ciliate, 5-nerved, and somewhat 5-angled, pubescent on the outer surface: corolla about 7 mm. long, tubular, 5-lobed, white; tube broad, about 4 mm. long, glabrous on the outer surface, densely pilose-pubescent in the throat; lobes subrotund, glabrous on either surface, strongly ciliate: style glabrous. — Collected by C. G. Pringle, in a wet wooded barranca above Cuernavaca, altitude 2,000 m., August–September, 1896, no. 6540. This species has much in common with the imperfectly known *C. Sessei*, D. Don, but as the latter species is so very obscure it seems best to regard Mr. Pringle's plant as distinct, especially as it does not accord in all details with the meagre description of Don's species.

Solanum (Morella) deflexum. An annual erect or ascending herb becoming slightly woody at the base: roots fibrous: stems 1 to 4½ dm. high, simple or much branched, terete, covered especially above with a spreading hirsute pubescence: leaves simple, solitary or in pairs of subequal size, 2 to 6 cm. long, one half as broad, ovate, acute or

obtusish, entire or subrepand, ciliate, strigose-pubescent upon either surface, and hirsute upon the midrib and veins beneath, abruptly contracted below into a narrowly winged petiole; petioles 5 to 22 mm. long, hirsute-pubescent: inflorescence extra-axillary of 1 to 4 slender reflexed pubescent pedicels, becoming in fruit about 2 cm. long: calyx deeply 5-parted. densely covered with a long spreading hirsute pubescence; divisions linear-oblong, acute, 3 to 7 mm. long, more or less persistent: corolla about 1 cm. in diameter; lobes broadly ovate, short-pubescent at the acute apex, externally covered with a few long scattered jointed hairs: stamens 5, equal; anthers oblong: ovary glabrous, 2(-4)-celled: fruit smooth, about 8 mm. in diameter; seeds oblique-ovate, corrugated, 3 mm. long. — Collected by Lucius C. Smith, at Cuicatlan, 15 July, 1895, no. 403; E. W. Nelson, between Topana, Oaxaca, and Tonala, Chiapas, altitude 61 to 150 m., 1–3 August, 1895, no. 2876[a]; and by C. G. Pringle, on shaded hillsides near Cuernavaca, altitude 1,500 m., 26 July, 1896, no. 6400. A species apparently well characterized by the inflorescence, calyx, and pubescence. Most nearly related to the *Solanum nigrum* group.

Solanum Mitlense, Dun. Specimens agreeing in all detailed characters with the original description of the above species were collected in the State of Oaxaca by Lucius C. Smith in the Calderon, San Juan del Estado, 1 June, 1894, no. 37; by E. W. Nelson, in the Valley of Oaxaca, altitude 1,540 to 1,600 m., 8 and 24 September, 1894, no. 1234; by C. G. Pringle, in ravines of hills near Oaxaca, altitude 1,750 m., 15 September, 1894, no. 4907; and by C. Conzatti and V. González, about the city of Oaxaca, altitude 1,550 m., 2 April, 1896, no 98. From Mr. Pringle's full and careful notes, the following additional characters may be given. Entire plant 3 to $4\frac{1}{2}$ m. in height, tree-like in habit; trunk 2 to $2\frac{1}{2}$ m. high, 1 to 2 dm. in diameter, trichotomously branched above, covered with a grayish brown bark, stout spines, and a scattered stellate pubescence: mature fruit green, globose, about 2 cm. in diameter: seeds 3 mm. long, oblique, compressed and scrobiculate.

Dicliptera Pringlei. Annual, herbaceous, 5 to 8 dm. high: roots fibrous: stems hexangular, somewhat furrowed, lineolate, puberulent upon the angles, swollen or constricted just above the nodes: leaves ovate to ovate-lanceolate, acuminate, acute, narrowed below into a slender petiole, entire, ciliate, lineolate with a few scattered hairs on either surface; petioles pubescent, $2\frac{1}{2}$ to $3\frac{1}{2}$ cm. long, becoming gradually shorter above: inflorescence much branched, open: heads on long slender pedicels, 1(-2)-flowered: outer bracts equal, elliptical, muticous,

glabrous, resupinate, 5 to 6 mm. long, two thirds as broad; inner bracts linear-linceolate, nearly 5 mm. long, 1 mm. broad, margins scarious; bractlets linear-lanceolate, diaphanous, about 4 mm. long with a rudimentary flower in the axil: calyx deeply 5-parted; divisions lance-attenuate, ciliate: corolla bilabiate, 1½ to 2 cm. long, yellowish white striped with purple in the dried state, externally pubescent: stamens with filaments and anthers purple: capsule smooth, about 6 mm. long; seeds orbicular, flattened, muricate. — Collected by C. G. Pringle, on lava beds near Cuernavaca, altitude 1,500 m., 3 November, 1896, no. 6602; and by E. W. Nelson, near Tlalixtaquilla, Guerrero, 10 December, 1894, no. 2256.

Buceragenia, nov. gen. of *Acanthaceæ* (*Eujusticieæ*). Calyx 5-parted, segments linear, subequal. Corolla tubular; tube cylindrical, erect, not ampliated above; limb short, 2-labiate, posterior lip interior, incurved, deeply emarginate or shortly 2-lobed, anterior erect or scarcely spreading, 3-lobed, external. Stamens 2, anterior, inserted at the middle of the corolla-tube, included; anthers 1-celled, oblong, medio-dorsally affixed, obtuse. Staminodea 2. Disk annular, inconspicuous. Style slightly thickened above, stigma minutely and unequally 2-lobed; ovules 2 in each cell. Capsule oblong, narrowed below into a solid stipe; seeds 4, suborbicular, flattened, strongly muricate or roughened; retinacula slender; embryo normal. — Herbaceous perennials having their affinity with the genus *Habracanthus*, but differing by the shallowly bilabiate corolla, and the presence of staminodea. The generic name is taken from *βοῦς*, *κέρας*, and *γίγνομαι*, in reference to the Spanish name Cuernavaca, from which place it comes.

Buceragenia minutiflora. Stems erect, about 1 m. high, simple, nearly naked below, branched and leafy above, glabrous; branches slender, internodes 5 to 12 cm. in length: leaves ovate, usually acuminate with an obtusish apex, rather abruptly narrowed at the base and attenuated into a long narrowly winged petiole, entire or subrepand, ciliate, minutely lineolate on the upper surface with a few scattered hirsutish hairs, pubescent on the midrib and prominent veins beneath, dark green above, paler beneath: inflorescence in slender interrupted spikes or spikoid racemes terminating the stem and branches, puberulent and stipitate-glandular; spikes (4 to 13 cm. long) on slender peduncles; bracts ovate, acute, about 1 mm. long; bractlets minute: calyx 2 to 5 mm. long, 5-parted, persistent; divisions subequal, linear, acute, puberulent and stipitate-glandular: corolla minute, 2 to 3 mm. long, tubular, 5-nerved, slightly enlarged below; lobes oblong, rounded at the apex, covered with

several erect or spreading hairs on the outer surface near the tip: capsule 13 to 15 mm. long, glabrous. — Collected by C. G. Pringle, in a wet barranca above Cuernavaca, altitude 2,000 m., 21 September, 1896, no. 6506.

Justicia Clinopodium, Gray, in herb. Stems ascending or erect, usually branching, terete, 2 to 5 dm. high, lineolate pubescent, also covered with long spreading villous pubescence, often interspersed with glandular hairs: leaves short-petiolate, obtuse, entire, subcordate at the base, with a scattered villous pubescence on either surface, especially upon the veins beneath, 2 to 5 cm. long, 1 to $2\frac{3}{4}$ cm. broad: petioles short, 1 to 5 mm. in length; inflorescence in terminal pedunculate spikes becoming 8 cm. long; bracts and bractlets lanceolate, acute, 10 to 15 mm. long, covered on the outer surface and margin with long villous hairs intermixed with glandular hairs: calyx deeply 4-parted, the equal or subequal divisions linear-acute, about equalling the bracts, externally villous-pubescent: corolla glabrous, about 2 cm. long, purple, the upper lip shortly bifid, the lower deeply 3-lobed, segments subequal, oblong, rounded at the tip: stamens of the genus, but with the adnate portion pubescent: style smooth: capsule glabrous, about 13 mm. long; seeds compressed, more or less densely covered with shaggy armed trichomes. — Collected by Bourgeau, in the region of Orizaba, 25 August, 1866, no. 2901; also by Botteri in the same locality without number; and by Ghiesbreght, in Chiapas, 1864–70, nos. 80, 684.

Bouvardia obovata, HBK. A stout glabrous herb nearly a meter in height: stems simple, unbranched, angular, striate-sulcate; internodes 5 to 13 cm. in length: leaves verticillate, 5 to 8 in each whorl, narrowly obovate or oblanceolate, 4 to 12 cm. long, 1 to 3 cm. broad, usually obtusish and submucronate, sometimes acute, entire, revolute, subrepand and often hispidulous on the margins toward the apex, gradually narrowed below the middle to a subpetiolate base, rather dark green to olive green in color (in the dried state), slightly paler beneath; midrib and veins rather prominent, especially beneath; interpetiolar stipules subdeltoid, acute or short-acuminate, unequally serrulate or sublaciniate: inflorescence in a terminal close subtrichotomous cyme: peduncles 9 to 12 mm. long; the ultimate divisions pruinose-puberulent: calyx deeply 4(-5)-parted; divisions linear, about 3 mm. long, acute, often deeply colored, ciliate or subhispidulous on the margins: corolla tubular, 4(-5)-parted, $2\frac{1}{2}$ to 3 cm. long, deep red or crimson, minutely pruinose or puberulent on the outer surface, glabrous within; lobes ovate, acute, about 4 mm. long: anthers subsessile in the upper portion of the corolla-tube: style

slender, filiform, exceeding the corolla; stigma 2-parted: capsule subglobose, somewhat compressed laterally, 8 to 9 mm. long, equally broad, and 6 to 7 mm. thick. — Collected by C. G. Pringle, on a mountain side near Cuernavaca, State of Morelos, 18 November, 1895, no. 7062, and in the same locality in 1896, no. 6330. The above plant is in all probability the one described in HBK. Nov. Gen. & Spec. iii. 385, notwithstanding the little discrepancy as to the number of leaves in the whorl, and the quadrangular stem; the former character is a variable one, as shown by many species of the genus, and the angulation of the stem depends to a great extent upon the number of leaves in the whorl. It seems best, therefore, in view of the very meagre description of the above species, which was doubtless drawn from a very incomplete specimen, to regard the above cited numbers of Mr. Pringle as representing the *Bouvardia obovata*, HBK., and to amplify the characters of the same.

Hamelia nodosa, Mart. & Gal. Specimens agreeing in all essential characters with Walper's description of the above species (Walp. Rep. vi. 51) were collected by Rev. Lucius C. Smith at Ojitlan, Oaxaca, altitude 198 m., 21 August, 1895, no. 605. The plant differs, however, in having the fruit elliptic-oblong (6 to 9 mm. long, one half as broad) instead of globose.

Crusea calcicola. An herbaceous annual: stems erect, branching from the base, tetragonal, glabrous or hispidulous on the angles: leaves lanceolate or lance-oblong, 2 to 4½ cm. long, 6 to 13 cm. broad, acute, somewhat narrowed at the base, margin revolute, scabrous, midrib and veins prominent beneath, glabrous on either surface, slightly paler beneath; stipules puberulent, 3 to 4 mm. long bearing 3 to 7 setæ on either side: inflorescence in axillary or terminal pedunculate involucrate heads: peduncles above puberulent and often hispidulous on the angles: floral leaves (subtending the heads) 1 to 2 cm. long, ciliated at the broadened base: bracts strongly dilated at the base, short-acuminate, shorter than the floral leaves: flowers short-pedicellate, intermixed with numerous laciniate pales: calyx small, about 2 mm. long, 4-lobed; lobes slightly exceeding the tube, narrow, acute, long-ciliate: corolla tubular, narrowed below, somewhat ampliated above, 4-lobed, about 4 mm. long, white; lobes oblong, obtuse, usually bearing on the outer surface near the apex a few spreading hairs: stamens exserted: stigma overtopping the anthers. — Collected by C. G. Pringle, on dry calcareous hills, Las Sedas, Oaxaca, at an elevation of 1,800 m., 8 September, 1894, no. 4869. Distributed as *C. cruciata*, Wats., but differing from the latter species in the character of the stem, the stipules, and the bracts.

Crusea coccinea, DC., var. pubescens. Leaves ovate, acute, often short-acuminate, covered above with a scattered hirsute pubescence: corolla-tube, especially the lower slender portion, pubescent on the outer surface. — Collected by E. W. Nelson, on the west slope of Mt. Zempoaltepec, altitude 2,100 to 2,400 m., 5–13 July, 1894, no. 581; also on the northwestern slope of the same mountain, altitude 2,400 to 3,000 m., 10 July, 1894, no. 699. Differs from the species proper by the smaller leaves, the pubescence of the same, and by the pubescent corolla.

Crusea cruciata, Watson, var. villosior. Stem $\frac{2}{3}$ to 1 m. in height: leaves lanceolate, acuminate, 9 to 12 cm. long, 1 to 2 cm. broad; floral leaves villous-pubescent on the lower surface near the base: flowers white to purple. — Collected by Dr. E. Palmer, at Jalisco, 1886, no. 901, and by C. G. Pringle, near Cuernavaca, altitude 1,600 m., 17 September, 1896, nos. 6508, 7225. With habit, laciniate stipules, and essential characters of the type, but somewhat more robust, and with a rather striking villous pubescence on the broadened basilar portion of the floral leaves.

Crusea villosa, Watson, founded upon Pringle's no. 2448 from Jalisco, collected in 1890, also Pringle's no. 3257 from the same locality, collected in 1890 and distributed under the above name, may be referred to *Crusea Palmeri*, Gray. Notwithstanding the somewhat remote localities, both of Mr. Pringle's numbers are identical with Dr. Gray's type, collected by Dr. Edward Palmer in Southwestern Chihuahua.

Galium prætermissum. Perennial: the slender woody roots containing a red coloring matter: stems 3 to $4\frac{1}{2}$ dm. long, slender, weak, decumbent, purplish at the base, green above, glabrous or hispidulous on the angles: leaves in fours, sessile, linear-lanceolate, 8 to 14 mm. long, 1 to 3 mm. broad, acute, margin revolute (hispidulous on the older leaves), upper surface usually hispidulous, shining, glabrous beneath: flowers in subtrichotomous cymes: pedicels 3 to 10 mm. long, glabrous or minutely hispidulous: corolla rotate, yellow, 4(-3)-lobed; lobes ovate-oblong, obtuse or short-acuminate and obtusish: fruit long-hirsute with uncinate hairs. — Collected by C. G. Pringle, in pine woods, base of Sierra de Ajusco, altitude 2,460 m., 19 September, 1896, no. 6596. A species with the habit of *G. Mexicanum*, HBK., but with leaves in fours, not pungent-acuminate, and with much longer uncinate hairs on the fruit.

Viburnum elatum, Benth. Excellent flowering and fruiting specimens, apparently belonging to this species, have been secured by Mr. Pringle, and the following additional characters may be noted. Drupe ovoid, 12 to 14 mm. long, black, covered with a blue bloom; stone flat,

broadly ovate or ovate-oblong, 9 to 11 mm. long, nearly as broad, convex on one surface, flat on the other with a short ridge near the base. — Collected by streams, Valley of Mexico, 10 October, 1896, no. 6226.

Stevia clinopodioides. An herbaceous perennial: roots fibrous, clustered at the base of the stem: stems simple or nearly so, about 30 cm. high, giving off at the base several slender horizontal subterranean root-stocks, closely pubescent above and purple: leaves opposite below, alternate above, spatulate, $2\frac{1}{2}$ to 4 cm. long, 6 to 10 mm. broad, obtuse at the apex, gradually narrowed below to the subpetiolate base, callously serrate along the upper half, entire below, appressed-puberulent on the veins and on the upper surface near the margin, glandular-punctate: inflorescence a compact dense umbel terminating the stems: heads about 1 cm. long, 5-flowered; involucral scales linear-acuminate, often slightly unequal, appressed-puberulent on the outer surface, greenish purple, 6 to 7 mm. long: flowers considerably exceeding the involucre: corolla with a slender greenish tube below, ampliated above, the upper ampliated portion and the limb purple; pappus paleaceous, short, exaristate: achenes glabrous, 3 to 4 mm. long. — Collected by C. G. Pringle, on the Serrania de Ajusco, altitude 3,000 m., 22 October, 1896, no. 6594.

Stevia diffusa. Annual: roots fibrous: stems herbaceous, erect, terete, greenish purple, hirsutish pubescent with jointed hairs, interspersed above with a stipitate glandular pubescence: leaves (including the petiole) 3 to 7 cm. long, 1 to 4 cm. broad, opposite below, becoming alternate above, membranous, broadly ovate to ovate-lanceolate (the uppermost often acuminate), acute at the apex, contracted below into a narrowly winged and ciliated petiole, crenate-serrate, or the more reduced leaves with a subentire margin, essentially glabrous upon either surface, except on the veins, where they are sparingly hirtellous: heads widely separated on long slender glandular pedicels, the latter from 1 to $1\frac{1}{2}$ cm. long; scales of the involucre 5, linear, acuminate, 6 mm. long, rather strongly 2-nerved, the outer surface appressed-puberulent, very rarely glandular: flowers one third longer than the involucre: corolla discolorous, tube purplish, puberulent, limb white: achenes puberulent, 3 mm. long: pappus paleaceous and 3-aristate. — Collected by C. G. Pringle, on lava beds near Cuernavaca, altitude 2,100 m., 3 November, 1896, no. 6608. Perhaps related to *S. micrantha*, Lag., but with longer corollas, shorter achenes, and a much more diffuse habit.

Stevia trachelioides, DC. It is interesting to note that Mr. Pringle has rediscovered this apparently rare species on the Serrania de Ajusco, altitude 3,000 m., 22 October, 1896, no. 6593, where specimens

were secured which agree in every detail with the original plant collected by Berlandier in the Valley of Toluca, no. 1164. Our plant as well as the type shows the inflorescence and the scales of the involucre to be glandular-pubescent, a character not mentioned in De Candolle's description, Prodr. v. 115.

Eupatorium oreithales. Perennial from a horizontal root-stock: roots fibrous, rather stout: stems herbaceous, erect, purple, pubescent, 5 to 6 dm. high, leafy below, nearly naked above, frequently branching at the base: leaves opposite, broadly ovate, obtuse or rounded at the apex, subtruncate or short-cuneate at the base, crenate, hirtellous on the upper surface, puberulent on the veins beneath, becoming essentially glabrous, 2 to 5 cm. long, nearly or quite as broad: petioles pubescent, purple, 1 to 3 cm. long: heads few, disposed in loose terminal corymbs, about 10 mm. high, 50–60-flowered: involucral scales about 2-seriate, nearly equal, greenish purple, pubescent, linear-oblong, acute, ciliate, about 6 mm. long: corollas white, 4 to 5 mm. long, tubes slender below, about equalling the ampliated upper portion, the lobes pubescent on their outer surfaces: pappus about as long as the corolla-tube: achenes 3 mm. long, puberulent. — Collected by C. G. Pringle, on the Serrania de Ajusco, altitude 2,400 m., 28 September, 1896, no. 6563. Nearly related to *E. Saltivarii*, Schz. Bip., but readily distinguished by its broader more rotund and crenate leaves, and also by the nearly naked stem and longer petioles.

Eupatorium euonymifolium, Greene, Pittonia, iii. 31 = *E. Lemmoni*, Rob. Proc. Am. Acad. xxvii. 171.

Eupatorium kœlliæfolium, Greene, l. c. = *E. hyssopinum*, Gray, Proc. Am. Acad. xv. 28.

Gnaphalium linearifolium. Annual, becoming somewhat ligneous below, herbaceous above: stems terete, white-lanate, 2 to 4 mm. in diameter, simple or branched, 7 to 10 dm. high: leaves sessile, linear-attenuate, 1 (–3)-nerved, margin revolute, arachnoid-pubescent above, white-tomentose beneath, later becoming reflexed, 6 to 11 cm. long, about 2 mm. wide: inflorescence corymbose: heads sessile or nearly so, 6 mm. high; involucre about 4-seriate; scales stramineous, the outer ovate-acute, inner oblong-obtusish: flowers numerous, perfect flowers about ten: achenes terete, glabrous. — Collected by C. G. Pringle, on rocky hills near Guadalajara, 7 October, 1889, no. 2342 (distributed as *G. leptophyllum*, DC.); on the Sierra de San Felipe, at an altitude of 2,150 m., 17 November, 1894, no. 5685; and also in the latter locality by C. L. Smith, no. 592.

Sclerocarpus Schiedeanus, Benth. & Hook., var. elongatus. A slender much branched herb, 1 to 1½ m. high: leaves lanceolate, 5 to 12 cm. long, 5 to 12 mm. broad: ray-flowers 5 to 8. — Collected by L. C. Ervendberg, at Wartenberg near Tantoyuca, Prov. Huasteca, 1858, nos. 98, 99, and by C. G. Pringle, in fields around Cuernavaca, altitude 1,600 m., 31 October, 1896, no. 6606. A variety readily recognized by its slender habit and long narrow leaves.

Verbesina oncophora, Rob. & Seaton? Specimens collected by C. G. Pringle, under bluffs of barranca above Cuernavaca, altitude 2,000 m., 1 November, 1896, no. 6600, agree in inflorescence and floral characters with this species, but differ conspicuously by having opposite or subopposite and more remotely denticulate leaves, also by the absence of any excrescences on the stems at the base of the leaves. Further material may show this plant to be worthy of specific rank, but for the present at least the writer prefers to regard it as a form of the above named species.

Verbesina stenophylla. Stems herbaceous, winged, erect from a ligneous base, about 1 m. in height, essentially glabrous below, hirtellous-puberulent above: leaves alternate, narrowly spatulate, 7 to 18 cm. long, 6 to 10 mm. broad, obtuse or acute at the apex, gradually narrowed below to a sessile decurrent base, entire or inconspicuously denticulate, somewhat roughened on the margins, glabrous above, below glabrous or in the earlier stages hirtellous, midrib prominent beneath, veins semitransparent, rather strongly reticulated; the upper leaves gradually reduced to linear-attenuate bracts: inflorescence in a single terminal head or disposed in a single cyme: heads few, about 12 mm. in diameter (including the rays 3 to 3½ cm. in diameter); involucral scales 2–3-seriate, linear, hirsute-pubescent; ligules yellowish white, about 10 in number, 10 to 12 mm. long; chaff oblong-linear, attenuate above to an acute apex, margin somewhat erose near the tip: achenes 6 mm. long, 4 mm. broad, strongly winged with subciliated margins, and scattered hirsute pubescence on either surface. — Collected by C. G. Pringle, on moist slopes above Cuernavaca, altitude 2,000 m., 18 September, 1896, no. 6503.

Bahia Pringlei. Perennial by slender rhizomes: stems branching from the base: branches ascending, 25 cm. or more high, hoary pubescent: leaves opposite or alternate, triternately compound, segments linear, obtuse, white hirsute-pubescent: heads 12 mm. high, nearly 2 cm. in diameter, usually on long slender peduncles: involucre about 3-seriate, hirsute; scales several, oblong-linear to subobovate, the inner ones with scarious margins: rays yellow, 6 to 7 mm. long, 2 mm. broad: disk-flowers numerous: corolla 5 mm. or more long, externally glandular-

pubescent: pappus of about 8 broadly obovate scarious scales, 2 mm. long, nearly or quite as broad: achenes puberulent, 4 to 5 mm. long. — Collected by C. G. Pringle, on calcareous bluffs, near Tula, altitude 2,100 m., 6 August, 1896, no. 6407. Allied to *B. Schaffneri*, Wats., from which it is distinguished by its perennial base, large heads and flowers.

Tagetes triradiata. An annual erect branching glabrous herb, 4 to 5 dm. high: stems sulcate, striate, greenish purple: lower branches opposite, upper alternate, ascending: leaves imparipinnately divided to the narrowly winged midrib; divisions subopposite in 7 to 10 pairs, narrowly lanceolate, dentate with acute and often setigerous teeth, 10 to 16 mm. long, 3 to 6 mm. broad, much reduced near the base of the leaf: inflorescence paniculate, formed by the branches terminating in slender pedunculate heads: peduncles somewhat thickened above, 2 to 3 cm. long: heads cylindrical or somewhat spindle-shaped, 1 to 1½ cm. long, about 12-flowered; involucre greenish purple, obtusely 3–4-dentate, often split down the side to one third its entire length; rays three, bright yellow, including the achenes 14 mm. long, tube somewhat angular, puberulent on the angles, the expanded portion unequally 3-lobed, about twice as broad as long; disk-flowers polygonal, puberulent: pappus variable, usually of 6 unequal scales, 2, 3, 4, or even 5 of the scales hispidulous, long acuminate-aristate, the others short linear-oblong or spatulate, obtuse; achenes appressed-puberulent, about 7 mm. long. — Collected by C. G. Pringle, Pedigral (lava beds), Valley of Mexico, altitude 2,300 m., 12 October, 1896, no. 6592. In general habit closely resembling *T. fœtidissima*, DC., differing, however, in the number of the ray-flowers, the character of the same, and also in the character of the pappus.

Cacalia suffulta. Stems 2 to 3 m. high, terete, sulcate-striate, purple, glabrous, leafy throughout: lower leaves orbicular-ovate, cordate, 15 to 18 cm. long, 18 cm. or more broad, palmately nerved, 9–11-lobed, mucronate-denticulate, above glabrous, below hirsutish on the strongly reticulated veins; petioles 10 to 12 cm. long; upper cauline leaves considerably smaller, 5 to 8 cm. long, equally broad, puberulent on the veins above (becoming glabrous), hirsutish on the veins and nerves beneath, becoming gradually reduced above to the sessile foliar bracts of the subcorymbose inflorescence: outer clusters of the corymb on long naked striated purple peduncles: heads large, 2 to 2½ cm. high, about 2 cm. in diameter, subtended and rather closely enveloped by ovate-oblong obtuse sessile bracts: involucre about 2-seriate; scales oblong, obtuse, 10 to 14 mm. long, 3 to 4 mm. broad, greenish purple, glabrous, somewhat keeled on the back, much thickened at the base, apex often ciliated:

flowers numerous (about 60), including the achenes 2 cm. or more in length: achenes short, columnar, striate, puberulent, 3 mm. long in the flowering stage: pappus silvery white. — Collected by C. G. Pringle, on a wet barranca above Cuernavaca, altitude 2,000 m., 1 November, 1896, no. 6626. A very distinct species of *Cacalia*, the younger leaves much resembling the foliage of *Senecio reticulatus*, DC., and with the inflorescence of *C. platylepis*, Rob. & Seaton.

CYNARA CARDUNCELLUS, L. This very showy plant, native of the Old World, appears not to have been hitherto recorded from Mexico. It was collected by Wislizenus, at Saltillo, Coahuila, no. 310, and by E. W. Nelson, at Celaya, Guanajuato, no. 3866.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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Presented by B. L. Robinson, 9 June, 1897.

I.—A SYSTEMATIC STUDY OF THE UNITED STATES AND MEXICAN SPECIES OF PECTIS.

The genus *Pectis* was founded by Linnæus[1] in 1758, to embrace two West Indian species, *P. ciliaris* and *P. linifolia;* the latter founded upon a plate of Sloane[2] which is well matched by the West Indian plant with corneous subulate awns. In November, 1759, Linnæus[3] gave more complete descriptions of these species, and an additional reference for *P. linifolia.*[4]

In 1762 Jacquin[5] described his *P. punctata*, which was based upon one of Plumier's figures[6] in which the leaves are represented as entire and bearing conspicuous marginal glands; while the pappus is described by Plumier[7] in the words "corona foliacea." (This figure has since been referred by De Candolle[8] to *P. Swartziana*, Less.). In 1763, in a much fuller account of the plant, Jacquin[9] describes the pappus as two setæ ("Sem. Hermaphrodita solitaria, linearia, instructa setis duabus"); and the leaves, according to the plate and the description, have cilia at their bases. Linnæus,[10] in the same year, recognized Jacquin's *P. punctata* as distinct from his own *P. linifolia*, though his distinguishing character

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[1] Syst. Nat. ed. 10, 1221.
[2] Hist. Jam. i. t. 149, f. 3 (as *Hieracium*).
[3] Amœn. Acad. v. 407.
[4] *Tagetes ?* 2, Browne, Jam. 319.
[5] Enum. Pl. Carib. 28.
[6] Plum. Pl. Amer. ed. Burm. t. 86, f. 1 (as *Knautia*).
[7] l. c. 74.
[8] Prodr. v. 99.
[9] Stirp. Amer. 216, t. 128.
[10] Spec. ed. 2, 1250.

was found only in the punctate leaves of the former. In the same work[1] Linnæus refers to *P. ciliaris* one of Plumier's figures[2] which is hardly recognizable as the West Indian and Florida species, and, as De Candolle[3] suggests, is more likely *P. Carthusianorum*. *P. minuta*, described at the same time by Linnæus,[4] is an obscure thing unless it is the *P. minuta* of Willdenow's Herbarium, referred by Lessing[5] to *P. pygmæa*, or the *P. minuta*, Schreb.,[6] which has been referred to *Bellium minutum*, L. The genus *Seala* was founded by Adanson[7] in 1763 partly upon Plumier's figure[8] which Linnæus had referred to his own *P. ciliaris*.

In 1788 Swartz[9] described *P. humifusa*, a West Indian plant based upon one of Plumier's descriptions and plates;[10] and three years later, in 1791, he described a *P. ciliaris*,[11] which is obviously not *P. ciliaris*, L., and which has subsequently been named by Lessing[12] *P. Swartziana*. In the same work Swartz[13] describes a *P. punctata*, not with the pappus a foliaceous crown as in Plumier's plant (De Candolle refers Plumier's plate to *P. Swartziana*), or merely of two setæ as in Jacquin's second description, but with the pappus of three *subulate* setæ; and this character, as well as the general description of the plant, seems to identify it with *P. linifolia*, L.

During the remainder of the decade three species were published, only one of which proved a good *Pectis*. *P. pinnata*, Lam.[14] (1792) has been identified with *Schkuhria abrotinoides*, as has also *P. multifida*, Orteg.[15] (1797). Cavanille's *P. prostrata*,[16] published in 1797, from Mexico, is a common species.

The first extensive consideration of the genus in this century was by

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[1] Spec. ed. 2, 1240.
[2] Plum. l. c. t. 151, f. 2.
[3] l. c. 101.
[4] Spec. ed. 2, 1250.
[5] Linnæa, vi. 713 in syn.
[6] Schreb. in Steud. Nom. ed. 1, 103.
[7] Fam. ii. 131.
[8] Plum. Pl. Amer. ed. Burm. t. 151, f. 2.
[9] Prodr. 114.
[10] *Jacobæa humifusa, Hypericifoliis*, Plum. l. c. 84, t. 95, f. 2.
[11] Swartz, Obs. 307.
[12] Linnæa, vi. 711.
[13] l. c. 308.
[14] Jour. Hist. Nat. Par. ii. 150, t. 31.
[15] Hort. Matr. Dec. 45.
[16] Cav. Ic. iv. 12, t. 324.

Poiret,[1] who discussed five of the species already mentioned (omitting *P. minuta* and *P. prostrata*) and described an additional one, *P. fasciculata*[2] from an unknown habitat. *P. pinnata*, Lam. he retained doubtfully in the genus, and *P. punctata*, Jacq. he kept distinct from *P. linifolia*, L., describing the pappus of the latter as "deux poils roides et piquans," or in the ray-akenes "trois poils très-ouverts," while the pappus of the former he describes as "deux filets sétacés"; yet apparently Poiret had not seen this species and his description was drawn directly from Jacquin.

In 1816 Lagasca founded the genus *Lorentea*,[3] distinguished generically from *Pectis* by the character, "pappus paleaceo-setaceus, paleis pluribus, inæqualibus." The original species, *L. prostrata* from Cuba, has subsequently been identified[4] with *P. humifusa*.

Cassini in 1817 described the genus *Cryptopetalon*[5] with one species, *C. ciliare* from Peru. The genus was distinguished by the "aigrette . . . composée de squamellules nombreuses, plurisériées, inégales, filiformes, fortement barbellulées, roides comme des crins, rousses, entre-griffées à la base." In the same year he founded the genus *Chthonia*[6] with one species, *C. glaucescens*. This genus Cassini distinguished from *Pectis* by its paleaceous pappus, while in true *Pectis*, he argued, the pappus is of "squamellules subtriquètres, subulées, cornées, parfaitement lisses. Ainsi, les *pectis punctata* et *linifolia* doivent demeurer dans le genre *Pectis*; mais les *pectis humifusa*, *prostrata*, et probablement le *ciliaris*, doivent entrer dans le genre *Chthonia*."

The collections made by Humboldt and Bonpland during the great scientific expedition headed by Humboldt, contained at least four species of the genus *Pectis* (of which *Chthonia* was made synonymous), and these were described in 1820.[7] The characterization of the involucre, which had formerly been described as pentaphyllous, was extended in the generic description to include forms with 8 or 10 bracts, but the pappus character was limited to aristiform pales ("Akenia linearia, triangularicompressa, paleis compluribus aristæformibus coronata"[8]). Of the four species described two were from Mexico and two from New Granada;

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[1] Dict. v. 119–121.
[2] Poir. l. c. 120.
[3] Lag. Gen. et Sp. Nov. 28.
[4] Spreng. Syst. iii. 572.
[5] Bull. Soc. Philom. (1817) 12, & Dict. Sci. Nat. xii. (1818) 123.
[6] Bull. Soc. Philom. (1817) 33, & Dict. Sci. Nat. ix. (1817) 173, 174.
[7] HBK. Nov. Gen. & Sp. iv. 261–264.
[8] HBK. l. c. 261.

but one of the latter, *P. elongata*, with "aristis crebris (20–25), scabris, inæqualibus, patulis, rufescentibus, persistentibus, corollam et akenium æquantibus," has since been found in Mexico. *P. Bonplandiana*, with "aristis 8–10, scabris, basi paulo dilatatis, rufescentibus, corollam æquantibus," is identified with more recent specimens from Southeastern Mexico; and *P. canescens* is a species with variable pappus originally described as having the disk-akenes with "paleis 20–25, aristæformibus, scabriusculis, inæqualibus, rufescentibus, corollam vix superantibus, persistentibus," while the ray-akenes are with "squamulis nonnullis minutis subulatis." The fourth species, *P. pygmæa*, has not yet been found in North America.

In 1823 Cassini [1] discussed *Lorentea*, Lag., stating that it is undoubtedly the same as his own *Chthonia*. But, though Lagasca's genus was published some months before Cassini's, he clings to his own name, arguing, that compared with his own, Lagasca's description is inadequate. *Chthonia repens*,[2] based perhaps on *Pectis humifusa*, Swartz, and a second species, *C. leptocephala*,[3] are described; and after some speculative remarks upon the genus, Cassini says, "Nous présumons que les *Pectis pygmæa* et *Bonplandiana* sont des *Chthonia*, et que les *Pectis elongata* et *canescens* sont des *Cryptopetalon*."

In 1825 Cassini [4] discussed *Pectis*, restricting it to *P. linifolia*, L., and *P. punctata*, Jacq., and he again emphasized the distinctions he made between the genera: "Les vrais *Pectis* diffèrent essentiellement des *Chthonia* et des *Cryptopetalon*, par l'aigrette, dont les squamellules sont subtriquètres, subulées, cornées, parfaitement lisses; car les squamellules de l'aigrette des *Chthonia* sont paléiforme et dentées inférieurement, filiformes et barbellulées supérieurement; et celles des *Cryptopetalon* sont filiformes et barbellulées d'un bout à l'autre."

Torrey's *P. angustifolia*, described in 1828,[5] was the first species of *Pectis* recognized without awns, pales, or setæ. The original form with a squamellose crown is not, however, constant, for there are sometimes present one or two slender awns.

In 1830 Lessing [6] took up the name *Lorentea*, and applied it to a group very different from that of Lagasca. The characters as given by Lessing

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[1] Cass. in Dict. Sci. Nat. xxvii. (1823) 202–207.
[2] Cass. l. c. 204.
[3] Cass. l. c. 206.
[4] l. c. xxxviii. (1825) 202, 203.
[5] Torr. Ann. Lyc. N. Y. ii. 214.
[6] Linnæa, v. 135.

were: "Pappus disci 2-serialis, ser. ext. piliformi, brevi, interiori anguste paleacea, serrata, longa; radii nullus aut dimidiatus, coroniformis, brevis." To this genus he transferred *Pectis canescens*, at the same time describing *L. saturejoides* which differs from typical *L. canescens* chiefly in having no ray-pappus. In the same work Lessing instituted the subtribe *Pectideæ*[1] (then placed under *Vernoniaceæ*) to include *Pectis*, *Lorentea*, *Andromachia*, *Liabum*, and *Cacosmia*.

In 1831 Lessing[2] took up critically the genera of the subtribe *Pectideæ* as he then understood it, i. e. *Pectidium*, *Pectis*, and *Lorentea*. The new genus *Pectidium* had "Pappus aristis, paucis, subulatis, planis, rigidis, corneis, basi incrassatis, lævissimis, inæqualibus, achænio breviori-bus, demum divergentibus"; and the single species *Pectidium punctatum*, founded upon *Pectis punctata*, Jacq., is described as having on the disk-akenes two aristæ, on the ray-akenes three. Note that in the original generic description Linnæus says "*Pappus* aristatus,"[3] and that the characters of *Pectidium* are those ascribed by Cassini to "true *Pectis*," including *P. linifolia*, L., and *P. punctata*, Jacq. The genus *Pectis* (including *Cryptopetalon* and *Chthonia*, Cass., and *Lorentea*, Lag. not Less.) Lessing characterized by "Pappus uniserialis, serratus, aut late paleaceus, paleis 1-nerviis, semilanceolatis, in setam desinentibus, sæpe setigero-laciniatis, aut setaceo-paleaceus." In the genus as thus defined he placed *P. ciliaris*, L., *P. linifolia* [Less. not L.], *P. angustifolia*, *P. elongata*, *P. Bonplandiana*, *P. pygmæa*, and *P. prostrata;* and a number of new species, *P. Swartziana* founded upon *P. ciliaris*, Swartz,[4] in part, and four others from the West Indies. To the genus *Lorentea* he added *L. humifusa* (*Pectis humifusa*, Swartz), and a new species, *L. sessiliflora*, which we know only from South America.

In 1832 Torrey's *Pectis angustifolia* was taken up by Rafinesque[5] under the name *Helioreos*, though this name appears to have been overlooked by the subsequent authors who took up De Candolle's *Pectidopsis*.

In the Prodromus De Candolle[6] accepted, with slight modifications, the views of Lessing. He took up the original subtribe *Pectideæ* of Lessing;[7] but of his later subtribe *Pectideæ*[8] he made the division *Eupectideæ* to embrace *Pectidopsis*, *Pectidium*, *Pectis*, and *Lorentea*. Of *Pectis an*

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[1] Less. Linnæa, v. 134.
[2] l. c. vi. 706–721.
[3] L. Syst. Nat. ed. 10, 1221.
[4] Obs. 307.
[5] Atl. Jour. (1832) 145.
[6] Prodr. v. 98–103.
[7] Linnæa, v. 134.
[8] Less. l. c. vi. 706.

tifolia, Torr. he made a new genus *Pectidopsis*.[1] *Pectidium*, Lessing, was kept up, as was also his *Pectis* and *Lorentea*. *Pectis fasciculata*, Poir., which would seem a very distinct species, was reduced by De Candolle to *P. prostrata*, Cav., and six new species were described, five of them from Mexico. The genus *Lorentea* De Candolle divided into two sections, *Cryptopetalum* (for *Cryptopetalon*, Cass.), "Pappus radii paleis plurimis acuminato-setiformibus pappo disci brevioribus constans," and *Stammarium*, Willd. in Herb., "Pappus radii nullus aut dimidiatus auriculæformis brevis"; and he described five new species, *L. Hænkeana*, and *L. auricularis* (probably only a form of *Pectis canescens*, HBK.) from Mexico, and three from South America.

Hooker and Arnott,[2] in 1841, described two Mexican species, *P. Jaliscana* (printed *Taliscana*), "pappo radii et disci setis 3–6 aristatis basi dilatatis paleisque paucis brevissimis"; and *P. diffusa*, "pappi paleis setiformibus scabris inæqualibus in disco 10–20, in radio paullo paucioribus." And in the same year Torrey and Gray[3] in their Flora followed De Candolle and kept up *Pectidopsis* as a genus.

In 1844 Bentham published two Mexican species, *P. multiseta*[4] from Cape San Lucas, and *P. arenaria*,[5] in part from Acapulco. Both of these species are well represented by recent collections from the type stations. In 1846 Gardner[6] published six Brazilian *Lorenteas*, and the next year followed them with another. In 1847 J. D. Hooker[7] described two species from the Galapagos.

In 1849 Dr. Gray[8] concluded that, rather than to continue multiplying genera undistinguishable in habit and with "numerous variations and gradations" in pappus, it was necessary "to extend the character of Pectis and restore to it Pectidopsis, Pectidium, and perhaps Lorentea also." In the same work he proposed two additional subgenera, *Heteropectis* and *Pectothrix*. In the subgenus *Heteropectis*, "Pappus coroniformis et 1–4-aristatus, vel saltem fl. disci muticus; aristis serrulato-scabris," were placed *P. multiseta*, Benth., and *P. uniaristata*, DC.; and *P. fastigiata*, *P. filipes*, and *P. Coulteri* were described as new. In the subgenus *Pectothrix*, "Pappus e setis aristisve gracilibus basi vix dilatatis 6–20 (raro paucioribus) serrulato scabris vel barbellatis constans, conformis, aut fl. radii brevis auriculæformis," he placed *P. diffusa*,

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[1] DC. Prodr. l. c. 98.
[2] Bot. Beech. 296.
[3] Fl. ii. 62.
[4] Benth. Bot. Sulph. 20.
[5] Benth. l. c. 110.
[6] Hook. Lond. Jour. Bot. v. 239-241.
[7] Trans. Linn. Soc. xx. 206.
[8] Pl. Fendl. 61, 62.

Hook. & Arn., and *P. tenella*, DC. (connecting this group with *Pectis* proper); and *P. papposa* was described as new.

In 1852 Dr. Gray [1] showed that *Pectis angustifolia*, Torr. intergraded with his own *P. fastigiata*, and that with such evidence at hand both De Candolle's genus *Pectidopsis* and the species *Pectis fastigiata* were untenable. As a provisional arrangement of species Dr. Gray [2] then proposed the following: —

Pappus coroniformis, vel in disco vel in radio, et sæpius 1–4-aristatis:	
Aristis sursum scabris v. nullis. (P. angustifolia, filipes, uniaristata, et sp. nov. Am. Merid.)	PECTIDOPSIS.
Aristis corneis retrorsum hispidis. (P. Coulteri, multiseta.)	HETEROPECTIS.
Pappus uniformis, ex aristis paucis corneis lævissimis.	PECTIDIUM.
Pappus uniserialis, e paleis vel aristis basi paleaceo-dilatatis paucis.	EUPECTIS.
Pappus biserialis paleaceus, in radio nunc dimidiato-a[u]riculæformis, nunc nullus.	LORENTEA.
Pappus setosus, 1–2-serialis, setis capillaribus basi vix aut ne vix dilatatis, in radio nunc dimidiato-auriculæformis.	PECTOTHRIX.

Following the suggestion that *Lorentea* might well be united with *Pectis*, Schultz Bipontinus [3] transferred to *Pectis* the *Lorenteas* of De Candolle's Prodromus and of Hooker and Gardner, though his only new species, *P. Seemannii*, afterward proved to belong in another genus.[4]

In 1853 Dr. Gray [5] made additional notes on some of the old species, and described *P.* (*Pectothrix*) *longipes* and the anomalous *P. imberbis*. And in 1858 Triana [6] described his genus *Cheilodiscus*, "Pappus coroniformis quinquedentatus, dentibus acutis persistentibus," with only one species, *C. littoralis*, from New Granada. Apparently this belongs to the section *Pectidopsis*.

In 1861 Van Hall [7] published *P. febrifuga* from Curaçao. From the excellent plate accompanying the description, this would seem to be nearly related to *P. capillaris*. And since then a number of South American and West Indian species have been published, but these need not concern us here.

In the Genera Plantarum, Bentham and Hooker [8] suggested that further study was necessary to clear up Dr. Gray's sections *Eupectis*, *Pectothrix*, and *Lorentea*.

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[1] Pl. Wright. i. 82.
[2] l. c. 83.
[3] Bot. Voy. Herald, 309.
[4] Benth. & Hook. f. Gen. ii. 412.
[5] Pl. Wright. ii. 69, 70.
[6] Ann. Sci. Nat. ser. 4, ix. 36.
[7] Fl. Jard. Pays-Bas, iv. 33, pl.
[8] Gen. ii. 412.

In 1881 Hemsley [1] credited to Mexico 24 species of Pectis, though some of them doubtless cannot stand. *P. Liebmannii*, Sch. Bip., one of the best marked species of § *Pectothrix*, was described as new; and since the publication of Hemsley nine additional Mexican species have been described.

In 1883 [2] Dr. Gray discussed the genus *Pectis*, making many critical notes upon the species. He at that time modified his division of the genus, so that he recognized only three sections: —

1. Eupectis. Pappus paucipaleaceus, vel pauci-aristatus aristis setiformibus, nunc ex aristis et paleolis paucis vel definitis constans, plerumque uniserialis.

2. Pectothrix. Pappus (saltem fl. disci) multisetosus, inæqualis. plerumque biserialis, setis interioribus validioribus quandoque aristiformibus inferne sensim latioribus nec vero paleaceis.

3. Pectidium. Pappus bi-tricornis, nempe ex aristis paucissimis (1–4) validis corneis sæpius divergentibus.

This division was followed in the Synoptical Flora,[3] where *P. Rusbyi*, Greene, from Arizona, was described as new.

Two species, *P. gibbosa* and *P. linearis*, have been published in a recent number of La Naturaleza [4] from old descriptions written by La Llave in 1832. These descriptions, however, contain so little of a specific nature that it is impossible to tell from them alone what the plants may be.

The genus *Pectis* is, as Dr. Gray has remarked, a very natural one; in fact, it presents such intergradations that it is difficult to get a really satisfactory basis for division into sections. Habital characters in such a group, with many short-lived annuals, are very unsatisfactory: in many cases plants ordinarily perennial with a suffruticose base may develop as annuals. The color of the rays, the number and length of the basal setæ of the leaves, and the distribution of glands, are all characters so inconstant as to be of only minor importance. The only character which seems sufficiently constant, at least for the larger divisions into subgenera, is in the pappus, and even that presents some obstructions to the making of clearly defined groups.

In attempting to group all the United States and Mexican species, it seems that the best results are attained by a compromise between Dr. Gray's recent treatment of the genus (Proc. Amer. Acad. xix. 43–48). and his earlier division of it in Plantæ Wrightianæ (i. 83). The subgenus *Heteropectis* is sufficiently unique, apparently, in its retrorsely barbed

[1] Biol. Centr.-Am. Bot. ii. 224–227.
[2] Proc. Am. Acad. xix. 43–48.
[3] Gray, Syn. Fl. i. pt. 1, 360.
[4] La Nat. vii. Append. 84.

awns and low diffuse habit to separate it from the erect entire-leaved species of § *Pectidium* with smooth awns. The subgenus *Eupectis*, too, as recently defined by Dr. Gray, seems to contain two well marked groups, and therefore essentially the distinctions made by him in Plantæ Wrightianæ have been adopted: § *Eupectis*, with definitely paleaceous pappus, and § *Pectidopsis*, with a few slender but rather rigid aristæ. The subgenus *Pectothrix* has been taken up as defined by Dr. Gray in the Proceedings of the American Academy, it being impossible to find any satisfactory character to distinguish the old and confused § *Lorentea*.

As suggested before, these groups are not constant in their characters. But with the exception of a few cases, they are fairly well marked. Some forms of § *Eupectis* (*P. Berlandieri* and *Sinaloensis*) may have the pales rarely deciduous from the bases of slender awns, thus assuming the characters of § *Pectidopsis*. Other species (*P. arenaria* and *bracteata*) have in addition to definite pales some slender setæ, in this making a close approach to members of § *Pectothrix* (*P. Hænkeana*, *longipes*, *canescens*, &c.) with a few stout elongated setæ. In § *Pectidopsis* and § *Pectothrix* the pappus in either the disk or ray, or in both, may be reduced, and in such cases species, ordinarily well marked, may be confused. For instance, there are rarely such specimens of *P. papposa* with subfastigiate heads hardly to be distinguished from similar forms of *P. angustifolia*. In some species, too, of § *Pectidopsis* (*P. filipes* and *capillaris* for example), the pappus, either in the disk or ray, consists of rather stout smooth awns suggesting those of § *Pectidium*. In § *Pectothrix* the bristles are normally more than 10, but in *P. elongata* and *diffusa* they may become reduced in number and more or less dilated below, as in species of § *Pectidopsis* (*P. Berlandieri*, &c.). Species of § *Heteropectis* generally show little tendency to run into the other subgenera, but the disk-pappus in two species, *P. multiseta* and *ambigua*, is reduced. And in the apparently well-marked § *Pectidium* the pappus of *P. imberbis* may sometimes have, in addition to the rigid awns, a few paleaceous awns not unlike forms in § *Eupectis*; or the pappus may be entirely obsolete, as in the other subgenera.

PECTIS, L. Rather low branching mostly aromatic or heavy-scented herbs with opposite connate generally glandular-dotted leaves mostly with a few basal setæ, rarely setiferous to the tip, or even naked: heads small or middle-sized, mostly radiate, sessile or on bracteate peduncles, solitary or subcorymbose: involucre cylindrical or campanulate, naked at the base, of a single series of equal free generally glandular-dotted carinate and often involute bracts, more or less conduplicate

about the akene: receptacle naked: ray-flowers fertile, the rays yellow, rarely purple or white; disk-flowers perfect, the corolla 5-lobed, more or less bilabiate: style hispidulous, the short branches obtuse and without appendages: pappus of a few or many pales or awns or bristles, or reduced to squamellæ or to an auriculiform crown, or rarely wanting: akenes linear, terete or somewhat angled, generally pubescent, becoming glabrate. — Syst. Nat. ed. 10, 1221, Amœn. Acad. v. 407 & Gen. ed. 6, no. 963; Poir. Dict. v. 119; HBK. Nov. Gen. & Spec. iv. 261; Cass. in Dict. Sci. Nat. xxxviii. 202; Less. Linnæa, vi. 708; DC. Prodr. v. 98; Gray, Pl. Fendl. 61, Pl. Wright. i. 82, & Proc. Am. Acad. xix. 43; Benth. & Hook. f. Gen. ii. 412; Hemsley, Biol. Centr.-Am. Bot. ii. 224; Baker in Mart. Fl. Bras. vi. pt. 3, 285; Engl. & Prantl, Nat. Pflanzf. iv. Ab. 5, 266. *Seala*, Adans. Fam. ii. 131. *Lorentea*, Lag. Gen. et Spec. Nov. 28; Less. Linnæa, v. 135; DC. Prodr. v. 101. *Stammarium*, Willd. in Less. l. c. in syn.; DC. Prodr. v. 102, as section. *Cryptopetalon*, Cass. Bull. Soc. Philom. jan. 1817 & Dict. Sci. Nat. xii. 123. *Chthonia*, Cass. Bull. Soc. Philom. (1817) 33 & Dict. Sci. Nat. ix. 173. *Pectidium*, Less. Linnæa, vi. 706; DC. Prodr. v. 98. *Helioreos*, Raf. Atl. Jour. (1832) 145. *Pectidopsis*, DC. Prodr. v. 98; Torr. & Gr. Fl. ii. 62. *Cryptopetalum*, DC. l. c. 101, in syn. *Cheilodiscus*, Triana, Ann. Sci. Nat. ser. 4, ix. 36.

§ 1. Eupectis, Gray. Pappus (at least of disk) of comparatively large pales with or without terminal awns, or in one section with the pales often splitting away from the bases of the awns: involucre of 4 to 10 bracts. — Pl. Wright. i. 83 & Proc. Amer. Acad. xix. 44, in part. *Seala*, Adans. Fam. ii. 131. *Lorentea*, Lag. Gen. et Sp. Nov. 28; Gray, Pl. Wright. i. 83, in part. *Chthonia*, Cassini, Bull. Soc. Philom. (1817) 33, & Dict. Sci. Nat. ix. 173. *Pectis*, Less. Linnæa, vi. 708, in part; DC. Prodr. v. 98, in part.

* Pales few (4 to 6 in disk, 2 or 3 in ray).

+ Pales all attenuate or prolonged into awns or subulate tips.

++ Erect or diffuse, involucre 4-6 (usually 5)-bracteate: awns of the pappus with permanent paleaceous bases.

P. ciliaris, L. Slender, erect and sparingly branched or diffuse, 1 to 4 dm. high, the somewhat tetragonous stems smooth or sparingly puberulent above: leaves linear or linear-oblanceolate, acutish, 3 cm. or less in length, with 2 lines of large glands beneath and rarely a few irregularly scattered smaller ones; margins entire or closely serrulate, becoming revolute, bearing from 3 to 6 pairs of remote setæ well below

the middle: heads solitary or in 2's or 3's, sessile or subsessile in the axils of the leaves or on short leafy branches: involucre 5 to 6 mm. high, 10–15-flowered; the 5 linear-oblong bracts acutish, strongly conduplicate, keeled toward the bases, ciliate, bearing a few large glands especially toward the tips: rays narrow, 2 or 3 mm. long: pales subequal, the longest 1½ or 2 mm. long, lance-attenuate with a serrulate tip or with a lanceolate or lance-ovate fimbriate base tapering gradually to a serrulate awn; in the disk-pappus 1 or 2 shorter intermediate pales often present: akenes sparingly appressed-pubescent, 3 mm. long. — Syst. Nat. ed. 10, 1221, Amœn. Acad. v. 407, & Spec. ed. 2, 1250. *P. anceps*, Less. Linnæa, vi. 715, and *P. costata*, Ser. & Merc. in DC. Prodr. v. 100 *fide* Grisebach. *P. ciliata*, Steud. Nom. ed. 2, i. 360, in syn. *fide* Hook. f. & Jack. Ind. Kew. ii. 443. *Chthonia glaucescens*, Cass. in Dict. Sci. Nat. ix. 173, and *C. ciliaris*, Cass. l. c. xxvii. 206 *fide* Steud. l. c. (reduced to *Pectis ciliata*, doubtless a misprint for *P. ciliaris*) and *fide* Hook. f. & Jack. l. c. i. 532. — FLORIDA, Charlotte Harbor (Blodgett), Miami (Garber), Lastero Bay (Garber, no. 14), Tampa (Nash. no. 2479), Keys of Caximbas *fide* Chapman. Also in the West Indies.

P. Lessingii. More diffusely branched and more leafy than the last: leaves similar, but narrower, mucronulate, with 2 distinct rows of marginal glands: heads solitary on sparingly bracteate filiform peduncles 2 or 3 cm. long: bracts of involucre less conduplicate than in the last, the glands fewer or wanting: pappus more abruptly awned, or sometimes awnless: akenes spreading-pubescent or glabrate. — *P. linifolia*, Less. Linnæa, vi. 709 (excl. syn.), not L.; DC. l. c. 99 (excl. syn.); Griseb. Fl. Brit. W. I. 378; Gray, Syn. Fl. i. pt. 2, 360. — FLORIDA, Key West (Blodgett, Chapman), Palm Cape (Chapman), Miami (Garber), Cape Sable (Garber, no. 22, Simpson, no. 170), between Everglades and Biscayne Bay (Curtis, no. 1162). Also in the West Indies. A single anomalous specimen from Key West (Blodgett) has some of the leaves mucronulate and the solitary head subsessile, thus suggesting the preceding species.

++ ++ Depressed annuals: heads sessile or subsessile, with inconspicuous rays: pales subequal, lance- or linear-attenuate, sometimes awn-tipped.

= Pappus simply of attenuate pales, in the disk 5 or 6, in the ray 2 or 3.

P. prostrata, Cav. Stems prostrate, forming mats sometimes 4 dm. across (rarely simple and ascending), smooth or puberulent in lines: leaves oblanceolate or spatulate-linear, blunt or mucronate, 3½ cm. or less in length, 2 to 5 mm. broad, with many fine punctate dots on the pale

lower surfaces; margins entire or closely serrulate, slightly revolute, with 5 to 9 pairs of setæ mostly below the middle: heads solitary or in small terminal or axillary clusters: involucre oblong, 5 to 7 mm. high, 3 or 4 mm. broad, 9–25-flowered; bracts 5, oblong, blunt, with scarious margins and prominent thickened keels: pales sparingly serrulate, 2 to $2\frac{1}{2}$ mm. long: akenes spreading-hirsute or glabrate, $3\frac{1}{2}$ to 4 mm. long. — Ic. iv. 12. t. 324; Less. Linnæa, vi. 714; DC. Prodr. v. 100. *Chthonia prostrata*, Cass. Dict. Sci. Nat. ix. 173. — A common and polymorphous species, the typical form growing from the Southwestern United States to Yucatan and Guatemala. ARIZONA, near Camp Grant (Rothrock, no. 722), sandy plains near Mexican boundary (Pringle); NEW MEXICO (C. Wright, nos. 245, 1123); SONORA (Thurber, no. 971), Alamos (Palmer, 1890, no. 659); DURANGO (Palmer, 1896, no. 512); SAN LUIS POTOSI (Parry & Palmer, no. 361); OAXACA (Nelson, no. 1693); YUCATAN (Schott, no. 533, Gaumer, nos. 788, 1092); GUATEMALA, Santa Rosa (Heyde & Lux in John Donnell Smith's Exsic., no. 3366[b]). Canchón (Heyde & Lux, no. 6154). A puzzling form with narrow heads and leaves setiferous to the tip has been collected in Guatemala (Heyde & Lux, no. 4232).

Var. cylindrica. Leaves generally rounded at the tips, rarely mucronate; setæ fewer, 2 to 5 pairs near the base: heads generally solitary (in one specimen clustered): involucre longer and narrower, 8 or 9 mm. high, 2 or 3 mm. broad; bracts 3, thin, plane or a little conduplicate, finely canaliculate, the mid-vein slightly or scarcely thickened into a keel: akene and pappus a third longer than in the type. — Southwestern United States and adjacent Mexico. ARIZONA (Palmer, 1867, no. 128), Apache Pass (Lemmon, no. 619); NEW MEXICO (Palmer); COAHUILA, Monclova (Palmer, 1880, no. 640); SONORA, Guaymas (Palmer, 1887, no. 145).

Var. urceolata. Ferruginous-pubescent on the stems, midribs, and involucres: leaves large, the larger $3\frac{1}{2}$ cm. long, 6 mm. wide, with 8 to 12 pairs of setæ: involucre urceolate, 9 or 10 mm. high; the 5 thick bracts with broad rounded pubescent keels. — CHIHUAHUA, Hacienda San José (Palmer, 1885, no. 53).

= = Pappus a row of linear-attenuate setulose pales, with a minute exterior setulose crown at the base; pales the same number both in the disk and in the ray.

P. Schaffneri, Schz. Bip. Very low and slender, 5 cm. or so high: stems puberulent: leaves linear-attenuate, cuspidate, $1\frac{1}{3}$ to $2\frac{1}{2}$ cm. long, 1 to $1\frac{2}{3}$ mm. wide, margins entire or minutely serrulate, becoming entire:

involucre oblong-lanceolate, 6 mm. high, 8–9-flowered, of 3 or 4 oblong acute nerveless conduplicate but scarcely keeled bracts: pales 3½ or 4 mm. long, slightly exceeding the akenes. — Schz. Bip. in Gray, Proc. Am. Acad. xix. 45. — MEXICO, Valley of Mexico (Schaffner, no. 84).

++ ++ ++ Erect or diffuse: involucre 7–10-bracteate: pappus rufescent, the laciniate paleaceous bases often splitting away from the setulose awns.

P. Bonplandiana, HBK. Slender, erect or diffuse, dichotomously branched: the branches smooth or sparingly pubescent, 2 dm. or less in height: leaves linear-lanceolate, mucronate, entire or minutely serrulate toward the apex, 1 to 2½ cm. long, 1 to 3 mm. wide, irregularly dotted beneath, with 1 or 3 pairs of basal setæ: heads terminal or axillary, solitary on slender 4–5 bracteate peduncles 2 or 3 cm. long: involucre 4 to 4½ mm. high, about 20-flowered; bracts linear-oblanceolate, acutish or blunt, conduplicate, minutely puberulent at the tips, keeled from above the middle and bearing a few large glands: rays narrow, 2 mm. long: awns of pappus subequal, the longest 2 mm. in length, in the disk 5 or 6, in the ray 2, the lanceolate pales slightly laciniate: akenes puberulent, 3 mm. long. — Nov. Gen. & Spec. iv. 263; Less. Linnæa, vi. 712; DC. Prodr. v. 99; Gray, Proc. Am. Acad. xix. 46. *P. linearis*, Willd. in Less. l. c. in syn. *P. Seemanni*, Gray, l. c. v. 181, not Schz. Bip. — Eastern Mexico. TAMAULIPAS, Tampico *fide* DC. l. c.; QUERETARO, near Queretaro (Humboldt & Bonpland in HBK. l. c.); VERA CRUZ, Wartenberg near Tantoyuca (Ervendberg, no. 137), Mirador (Liebmann, no. 395).

P. Sinaloensis. Diffuse, the branches smooth or hirtellous, ½ to 4 dm. long: leaves oblanceolate or obovate-oblong, mucronate, entire, 2 cm. or less long, 2 to 8 mm. wide, sparingly dotted on the pale lower surfaces, naked or with 1 or 2 pairs of setæ: heads much as in the last but larger, on 4–7-bracteate peduncles 3 to 6 cm. (rarely 2½ cm.) long: involucre 4 to 5½ mm. high, 30–40-flowered; bracts more pubescent at the tips: rays 4 or 5 mm. long: pappus much as in the last, 3½ to 4 mm. long, the pales more deeply laciniate: akenes sparingly appressed-pubescent or glabrate, hardly equalling the pappus. — On dry hills, Northwestern Mexico, December and January. SINALOA, Mazatlan (W. G. Wright, no. 1204, F. H. Lamb, no 313). A specimen collected by Seemann (without locality) belongs here, as probably does his no. 1490 from Mazatlan, cited by Hemsley under *P. Bonplandiana*.

+ + Pales elliptic, mostly obtuse.

P. Swartziana, Less. Annual, erect, trichotomous above, slender, smooth, about 3 dm. high: leaves lanceolate or oblong-linear, obtuse or

acute, about 12 mm. long, 2 to 4 mm. wide, with 2 rows of large glands; margins scabrous, naked or with 1 or 2 pairs of basal setæ: heads about 5 or 6 mm. high, 10–12-flowered, on elongated peduncles: involucre cylindric, 5–8-bracteate, the conduplicate bracts obtuse and with scarious margins: pappus of short equal pales, or with one of them longer, lance-attenuate and serrulate. — Linnæa, vi. 711; DC. Prodr. v. 99 (Plum. Pl. Amer. ed. Burm. t. 86, f. 1). *P. patula*, L. f. in herb. *fide* DC. l. c. in syn. *P. punctata*, Swartz in herb. L'Her. *fide* DC. l. c. in syn. *P. ciliaris*, Swartz, Obs. 307, not L. — PANAMA, hills around Loseria (S. Hayes, no. 690 *fide* Hemsley); also in Jamaica and Hayti. Plant unknown to us, the description drawn from Lessing and De Candolle.

* * Pales many (10 to 20) at least in the disk.

+ Stems more or less spreading or decumbent: leaves broadly linear.

P. arenaria, Benth. A prostrate perennial, the smooth, thick stems creeping extensively and forming mats, sending up many short branches with rosettes of leaves: leaves linear or spatulate-linear, 1 to 4 cm. long, 3 to 6 mm. wide, rounded at the tips and mucronate, pale beneath, obscurely but closely pellucid-punctate, with a single marginal row of dark glands; margins revolute, entire, with 3 to 7 pairs of basal setæ: peduncles erect or curving, 1 to 7 cm. long, compressed, angulate and almost winged above, with 2 to 7 prominent lance-subulate bracts 6 mm. long: involucre broadly cylindrical or campanulate, 8 to 12 mm. high, 5 to 8 mm. broad, 20–90-flowered; bracts 5 to 8, flat, imbricate, from lanceolate to ovate-oblong, 2 to 6 mm. wide, obtuse or acutish, many striate, slightly keeled below the middle and tapering to conspicuously thickened bases, sometimes sparingly ciliate: rays lanceolate to ovate-oblong, 6 or 7 mm. long: pappus sordid; in the disk of 10 to 20 linear-subulate very unequal setiferous pales, 4 to 6 of them longer (4 mm. long) and more dilated below than the others; in the ray shorter and usually fewer pales: akenes compressed, 6 or 7 mm. long, smooth and glossy or sparingly short-setose. — Bot. Voy. Sulph. 110. The synonymy of this species is very confused, and, from the descriptions, it is difficult to make it out. *Lorentea multiflosculosa*, DC. was described in the Prodromus (v. 102) from Peru, and from the description seems to be a form of *Pectis canescens*, HBK. The name, however, was soon changed by Schultz Bipontinus to *Pectis multiflosculosa* (Schz. Bip. in Seem. Bot. Voy. Herald. 309), but according to Bentham and Hooker f. (Gen. ii. 412) *P. multiflosculosa*, Schz. Bip. in herb. is the same as *P. arenaria*, Benth. Since then, however, Klatt (Leopoldina, xx. 92) has founded upon *P. multiflos-*

culosa, Schz. Bip., not *Lorentea multifloseulosa*, DC., a new species, *P. bibracteata*. With no authentic specimens at hand of the plants of either Schultz or Klatt the synonymy must still remain confused. The foregoing description of *P. arenaria* is drawn in part from material which has been kindly compared by Mr. Thiselton-Dyer with Bentham's type.— Prostrate in the sands of the Pacific coast of Mexico and Central America. SINALOA, Mazatlan (F. H. Lamb, no. 971); COLIMA, Manzanillo (Palmer, 1890, no. 971); GUERRERO, Acapulco (Barclay *fide* Benth., Palmer, 1891, no. 481); SAN SALVADOR, Conchagua (Œrsted *fide* Benth.). Also in Ecuador and Peru.

P. grandiflora, Klatt. Stem herbaceous, glabrous, branching; branches leafy even to the apex, monocephalous: leaves opposite, linear, mucronate, 2 cm. long, 2 mm. wide, densely glandular-punctate, with 6 pairs of setæ: peduncles terminal, 2½ cm. long, curving, angulate, almost winged, with 2 median bracts: involucre campanulate, 1 cm. long, equally broad, 40-flowered; the 5 bracts broad-ovate, 6 mm. wide, many-striate, keeled, densely ciliate: rays lanceolate, 5 mm. long, 1½ mm. wide, reddish: pales 14, scabrous, unequal, yellowish: akenes elongate, 6 mm. long, short-setose.— Klatt, Botanisch. Beibl. z. Leopoldina, 1895 (comp. nov. Costaric.), 6. — COSTA RICA, "Vers la huche du Hâto-Viejo, versant du Pacifique, leg. janv. 1893" (Pittier, no. 7342). A species unknown to us, the foregoing description, translated from Klatt, in many ways suggesting *P. arenaria*, Benth.

P. depressa. A depressed annual, forming mats sometimes 3 or 4 dm. across: stems villous, very branching: leaves linear-oblong, 1 to 2 cm. long, 1½ to 5 mm. wide, mucronate, ciliate, with 3 to 5 pairs of basal setæ, beneath densely punctate and with slightly villous midribs: heads solitary on terminal and axillary filiform 3–4-bracteate peduncles about 2 cm. long: involucre companulate, 4 or 5 mm. high, 3 or 4 mm. broad, 35–40-flowered; the 5 unequal oblong obtuse bracts thin, ciliate and minutely punctate: rays oblong, yellow, 3 mm. long: disk-pappus of 10 or 12 linear-subulate unequal setulose pales and 3 or 4 longer ones, 2 mm. long; ray-pappus generally reduced to a short irregular crown of more or less confluent pales: akenes 2 mm. long, short-setose.— GUERRERO, very common in moist exposed places, Acapulco (Palmer, 1894, no. 16).

+ + Stems erect: leaves crowded, filiform.

P. bracteata, Watson. Perennial with a slender branching caudex: stems smooth, angulate, 2 or 3 dm. high, densely leafy toward the base, passing into many-bracteate long peduncles: leaves almost or quite fili-

form, 2 to 6 cm. long, with conspicuous subulate tips and 2 rows of dark glands, entire or rarely with 1 or 2 small lobes, but no setæ at the bases: peduncles elongate, 1½ to 2 dm. long, with many bracts, the lower bracts leaf-like, the upper reduced: heads large, 1 cm. or so high, almost as broad, 60–80-flowered; involucre of 8 to 15 oblong bracts thickened and herbaceous below, with conspicuous dark glands, scarious above, with round or subtruncate erose tips: rays oblong, 1 cm. long, white, becoming dark-striped with age: pappus sordid, of 10 to 20 subequal linear-subulate setiferous pales, a few of them setiform and hardly paleaceous below, 4½ or 5 mm. long, equalling the glabrate akenes. — Proc. Am. Acad. xxv. 155. — COAHUILA, calcareous hills, Carneros Pass (Pringle, no. 2403). Originally placed by Dr. Watson in § *Pectothrix*, but the definitely paleaceous pappus, strongly resembling that of *P. Sinaloensis*, places it rather in this section.

§ 2. PECTIDOPSIS, Gray. Annuals, or rarely perennials(?) with narrow leaves setiferous at the bases: involucre short-cylindrical, the bracts linear, often becoming strongly involute: pappus of a few (1 to 6) slender upwardly scabrous setiform rather rigid awns sometimes dilated at the bases, with or without a short crown of separate or united squamellæ, or sometimes reduced merely to the crown. — Pl. Wright. i. 82. *Helioreos*, Raf. Atl. Jour. (1832) 145. *Pectidopsis*, DC. Prodr. v. 98. *Pectis* § *Eupectis*, Gray, Proc. Am. Acad. xix. 44, in part.

* Low branching herbs with elongate-linear leaves: heads subsessile or short-peduncled, fastigiate: involucre about 8-bracteate. (Forms of *P. papposa* may be looked for here.)

7 P. tenella, DC. Low, 2 dm. or less high, spreading and branching from near the base: stems angulate, smooth or minutely puberulous: leaves mucronate, 1½ to 4 cm. long, 1 or 2 mm. wide, broadened at the bases, with prominent midribs and 2 rows of large glands on the lower sides; margins revolute, with 1 to 4 pairs of setæ at the bases: involucre 4 or 5 mm. high, 15–25-flowered; the bracts prominently keeled, with scarious margins, bearing toward the tips a large gland, and sometimes 1 or 2 below: rays oblong, 3½ to 5 mm. long, yellow: pappus merely of 2 to 6 slender variously unequal awns, the longest 2 to 4 mm. long: akenes slightly longer than the pappus, smooth or minutely short-setulose. — Prodr. v. 99; Gray in Torr. Bot. Mex. Bound. 73 & Proc. Amer. Acad. xix. 46. Plains, Southern Texas to Chihuahua and Tamaulipas. TEXAS, Laredo, and between the Rio Grande and the Nueces (Berlandier, nos. 599, 985, 2009, 2415), Rio Coleto (Thurber, no. 19); CHIHUAHUA, Chihuahua (Pringle, no. 648); TAMAULIPAS, near Mier (Gregg, no. 62).

P. angustifolia, Torr. Plant very aromatic, resembling *P. tenella*: pappus a shallow cup or crown of 4 or 5 more or less connate squamellæ. — Ann. Lyc. N. Y. ii. 214; Gray, Pl. Fendl. 61 & Gray in Torr. Bot. Mex. Bound. 73; Hook. Bot. Mag. ciii. t. 6286. *Helioreos*, Raf. l. c. *Pectidopsis angustifolia*, DC. Prodr. v. 98; Torr. & Gr. Fl. ii. 62. — Dry soil, KANSAS (Plank) and COLORADO (Parry, &c.) to LOWER CALIFORNIA (Palmer, 1887, no. 657) and CHIHUAHUA (Hartman, no. 817).

Var. subaristata, Gray. Pappus, in addition to the crown, of 2 slender awns. — Pl. Wright. i. 82. *P. fastigiata*, Gray, Pl. Fendl. 62. *P. angustifolia*, Gray, Proc. Am. Acad. xix. 46, in part, not Torr. — Southern Texas and New Mexico to San Luis Potosi. TEXAS, near Austin (Chas. Wright), between the Pecos and the Limpia (Chas. Wright, no. 244), Georgetown (Palmer, 1880, no. 703); NEW MEXICO, Deming (Kellogg); COAHUILA, Saltillo and Monclova (Palmer, 1880, nos. 701, 702); SAN LUIS POTOSI (Parry, no. 519), near Peotillos (Schaffner, no. 325).

* * Erect, branching above, heads short-pedunculate in cymose or glomerate inflorescences: involucre 3–5-bracteate: awns slightly dilated at bases. (Forms of *P. elongata* may be looked for here.)

P. fasciculiflora, DC. Stems erect from a slightly suffruticose base, smooth, 3 to 5 dm. high, branching mostly toward the summit: leaves linear-oblanceolate, obtuse or acute, sometimes mucronate, the largest 3½ cm. long, 6 mm. wide, faintly pellucid-punctate, entire, or closely serrulate, with 1 to 5 pairs of setæ toward the bases, or the lowest leaves rarely naked: heads crowded on short branches in the axils of the reduced floral leaves: involucre 4 to 6 mm. high, 8–12-flowered; bracts linear, acuminate, keeled below the middle: rays oblong, 3 mm. long: pappus 1 to 3 very slender awns 4 or 5 mm. long, with or without a shallow irregular squamellose cup at the base: akenes minutely setulose or glabrate, half as long as the pappus. — Prodr. v. 100. — Southwestern Mexico, first collected by Hænke. GUERRERO, San Marcos (Nelson, no. 2268). A little known species apparently well represented by Mr. Nelson's plant.

P. fasciculata, Poir. With the habit of the former: the leaves "ovales, lancéolées, élargies": the involucral bracts oblong, obtuse, and the pappus "une membrane qui supporte latéralement deux filets soyeux." — Dict. v. 120. — A plant, judging from the description, very near if not quite *P. fasciculiflora*, though placed by De Candolle in *P. prostrata*.

P. Berlandieri, DC. A low annual, 1 or 2 dm. high, of bushy habit, with many angulate smooth or minutely puberulent ascending

branches: leaves linear, the largest 3 cm. long, acuminate, sometimes mucronate, scabrous, with 2 to 4 pairs of setæ toward the bases: heads in an open leafy cyme, or glomerate: involucre 5 mm. high, about 12-flowered; the 5 linear acuminate bracts strongly conduplicate and slightly keeled toward the bases: rays narrow, 2 mm. long: pappus of subequal slender awns, $3\frac{1}{2}$ to 5 mm. long; in the disk 5 or 6 (rarely 7), in the ray 2 or 3: akenes $2\frac{1}{2}$ to $3\frac{1}{2}$ mm. long, minutely short-setose or glabrate. — Prodr. v. 100; Gray, Proc. Am. Acad. xix. 46. — Eastern Mexico, near the coast. TAMAULIPAS, San Fernando (Berlandier, nos. 1537, 3037), near Tampico (Palmer, 1879, no. 1096); VERA CRUZ, between Tantoyuca and Tampico (Berlandier, no. 732), near Tantoyuca (Berlandier, no. 2152).

* * * Erect, simple or branching mostly above the base, stems purplish: leaves linear or lanceolate, the glands scattered or in lines between midrib and margins: heads scattered or solitary on long slender peduncles (2 or more times as long as the head): involucral bracts about 5, acute or acuminate, purplish: rays yellow or purplish. (Forms of *P. diffusa* may be looked for here.)

+ Awns obviously dilated at the base.

P. capillaris, DC. Erect smooth or minutely pubescent annuals, 1 or 2 dm. high, with slender subtetragonous stems diffusely branching above: leaves linear, mucronate, the larger 3 cm. long, 3 mm. wide, above scabridulous, beneath with prominent midribs and two rows of large glands about midway between the margins and midribs; margins with 2 to 5 pairs of setæ below the middle: peduncles many, terminal and from the upper axils, capillary, 2 or 3 cm. long, 2–4-bracteate: involucres 4 to 6 mm. high, 10–15-flowered: rays oblong, 2 mm. long: pappus 2 to 6 (or even 1) slender awns 4 or 5 mm. long, with or without a few squamellæ at the bases: akenes hardly equalling the pappus, appressed short-setose or glabrate. — Prodr. v. 99. *P. Jaliscana* (printed *Taliscana*), Hook. & Arn. Bot. Beech. Voy. 296; Hemsley, Biol. Centr. — Am. Bot. ii. 225, in part; Gray, Proc. Am. Acad. xix. 46; Klatt, Leopoldina, xx. 91 (reprint 4). — Southwestern Mexico. JALISCO, Jalisco (Beechy *fide* Hook. & Arn.), Rio Blanco (Palmer, 1886, no. 760). Plains of Guadalajara (Pringle, no. 1813, in part); OAXACA, near Las Bacas, *fide* DC. l. c. There is little doubt that *P. Jaliscana*, described from incomplete material, is the same as De Candolle's plant. *P. Jaliscana* was based upon a form with squamellæ at the base of the awns, but in Palmer's Rio Blanco plants akenes with and without squamellæ are found on the same individual.

Var. paucicapitata. Slender, with a few elongated ascending branches: leaves variable in size, the largest 5 cm. long, 5 mm. wide,

with 4 or 6 rows of glands (only 2 rows on the small leaves); margins with 5 to 9 pairs of setæ: peduncles very few and scattered, capillary, 1 or 2 cm. long, 1–3-bracteate, involucre 5 mm. long, about 10-flowered: pappus of 2 or 3 setiform awns barely as long as the akene. — *P. Berlandieri*, DC.? var. *Palmeri*, Gray, Proc. Am. Acad. xxi. 393. — CHIHUAHUA, south of Batopilas (Palmer, 1885, no. 61).

+ + Awns slightly or not at all dilated at the base.

P. uniaristata, DC. Stems compressed-angulate, smooth or roughish below the nodes, very diffusely branched from below the middle, 1 to 3 dm. high: leaves mucronate, scabrous above, with 2 or 4 rows of glands beneath, bearing 3 to 5 pairs of setæ; the cauline leaves about an inch long, the others becoming reduced to small bracts: peduncles slender, 8 to 13 mm. long, 1–3-bracteate: involucre 4 or 5 mm. high, about 10-flowered: pappus a shallow cupuliform crown and 1 or 2 (rarely 0) very slender setiform awns, 2 mm. long: akenes equalling the pappus, appressed short-setose. — Prodr. v. 99; Gray, Proc. Am. Acad. xix. 46. — Mexico *fide* DC. l. c.; JALISCO, plains of Guadalajara (Pringle, no. 1813, in part); COLIMA, Manzanillo (Xantus). Both plants which have been examined have the stems distinctly angulate, not "terete" as in De Candolle's characterization; but otherwise they conform closely to his description.

+ + + Awns none, pappus merely a squamellose cup.

P. dichotoma, Klatt. Erect or suberect, 8 to 15 mm. high, glabrous, somewhat dichotomous-branching: leaves spatulate-linear, submucronate, the largest about 2 cm. long, 2 mm. wide, with 2 or 4 rows of glands beneath, and bearing 2 to 4 pairs of setæ: peduncles capillary, 1½ cm. long, naked or with 1 or 2 bracts: involucre 3 or 4 mm. high, 8–10-flowered: cupuliform pappus slightly longer than in *P. uniaristata:* akenes short-setose or glabrate. — Leopoldina, xx. 92 (reprint 5). *P. filipes*, Sch. Bip. in herb., not Harv. & Gray. *P. Jaliscana*, Hemsley, Biol. Centr.-Am. Bot. 225, in part, not Hook. & Arn. *P. uniaristata*, DC., var. *holostemma*, Gray. Proc. Am. Acad. xix. 46. — Mexico, at Consoquitlo (Liebmann, no. 394).

* * * * Branching mostly from the base, often very diffuse: leaves linear with large scattered marginal glands: heads scattered or more or less clustered, on elongated capillary peduncles: involucral bracts 5 to 8, obtuse or acutish.

+ Involucre 5-bracteate: awns obviously dilated at the base.

P. filipes, Harv. & Gray. Very slender (or the stem rarely becoming stout), 1 to 5 dm. high; the diffuse branches smooth and shining or

scabrous, the internodes elongated: leaves plane or revolute, smooth or scabrous toward the bases, obtuse or acute and sometimes mucronulate, shorter than or equalling the internodes, in large specimens 5 or 6 cm. long, 3 mm. wide, naked or bearing 1 to 5 pairs of basal setæ: peduncles terete, 2 to 8 cm. long, ebracteate or with 1 to 3 remote bracts: involucre 4 to 6 mm. high, about 10-flowered, the bracts blunt or quite obtuse, plane or slightly keeled below the middle, generally glandless or with faint glands: rays 5 or 6 mm. long: pappus 1 to 4 slender rigid awns $2\frac{1}{2}$ to 4 mm. long, and sometimes a few blunt squamellæ at the base: akenes 4 or 5 mm. long. — Harv. & Gray in Gray, Pl. Fendl. 62; Gray, Pl. Wright. ii. 69, in Torr. Mex. Bound. 73 & Bot. Cal. i. 400. *P. Jaliscana*, Hemsley, Biol. Centr.-Am. Bot. ii. 225, in part, not Hook. & Arn. *P. punctata*, Wats. Proc. Am. Acad. xxiv. 58, not Jacq. — A lemon-scented species common in the mountains from Southwestern Texas through New Mexico, Arizona, and adjacent Mexico. TEXAS, Pena Colorado (Havard, no. 11); NEW MEXICO, Coppermine Creek (C. Wright, no. 1125), Coke Cañon (Thurber, no. 1167); ARIZONA, Sulphur Springs (Rothrock, no. 539), near Fort Huachuca (Lemmon, no. 2781), Santa Rita Mts. (Pringle); SONORA, Guaymas (Palmer, 1887, no. 656). Founded upon Coulter's no. 329 from "California."

Var. subnuda. Suberect, branching mostly above the base: peduncles $1\frac{1}{2}$ to 3 cm. long, ebracteate or with one or two apical bracts: involucre pale, purple-tinged, 5 mm. high, the bracts acutish or rarely obtuse: rays 3 or 4 mm. long: the 1 or 2 awns 2 mm. long, usually with dilated bases: akenes $3\frac{1}{2}$ or 4 mm. long. — Southeastern Arizona and adjacent Mexico. ARIZONA, Bisbee (F. E. Lloyd); SONORA, Cocuto (Hartman, no. 70); CHIHUAHUA, Janos (Schott).

+ + Involucre about 8-bracteate.

++ Bracts broad-linear, flat at least above the middle, very obtuse.

= Pappus of both ray- and disk-akenes aristiform

P. Pringlei. Low, 5 or 6 cm. high, divergently much-branched, with strongly angulate glabrous branches and peduncles: leaves revolute, slender, mucronate, equalling or longer than the internodes, 1 to 2 cm. long, barely 1 mm. wide, with 2 pairs of basal setæ: peduncles $1\frac{1}{2}$ to $2\frac{1}{2}$ cm. long, usually 1–2-bracteate: involucre 5 or 6 mm. high, about 25-flowered; the bracts plane above, strongly keeled below, bearing a large apical gland, and 1 or 2 smaller ones below: rays 5 mm. long: pappus 2 or 3 very slender awns 3 to 5 mm. long, slightly dilated below: akenes equalling or slightly exceeding the awns. — DURANGO, Jimulco (Pringle, no. 125).

= = Ray-pappus aristiform, disk-pappus squamellose.

P. Rusbyi, Greene. "Mint-scented," low, hardly 1 dm. high, simple or divergently but sparingly branched, the angulate stems and peduncles glabrous: leaves flat or a little revolute, spatulate-linear, with blunt or rounded tips (or a few mucronulate), 2 to 3½ cm. long, 1 to 3 mm. wide, with 2 or 3 pairs of setæ: peduncles 3 to 6 cm. long, 2–5-bracteate: involucre 4 to 6 mm. high, 30–40-flowered; the flattish bracts slightly keeled below, each bearing a large apical gland: rays 6 mm. long: ray-pappus 2 or 3 very slender awns 2½ or 3 mm. long, scarcely dilated below; disk-pappus a crown of many setaceous-tipped squamellæ, free or united at the base: akenes 4 mm. long, sparingly setose or glabrate. — Greene in Gray, Syn. Fl. i. pt. 2, 361. — ARIZONA, Beaver Creek (Rusby, no. 317).

++ ++ Bracts narrow-linear, involute, acutish. (Forms of *P. papposa* may be looked for here.)

= Pappus aristiform.

P. Rosei. Very diffusely branching from the base; the purplish terete stems smooth: leaves strongly revolute, becoming subterete, mucronate, equalling or exceeding the internodes, 2 to 4 cm. long, ½ to 1 mm. wide, with 2 pairs of basal setæ: peduncles many, terete, 2 to 4 cm. long, 4–6-bracteate: involucre 3 or 4 mm. high, about 20-flowered, the acutish bracts strongly keeled and bearing conspicuous elongated black glands: rays narrow, 3 mm. long, becoming rosy-tinged: pappus 2 or 3 slender awns 2 mm. long; and often a minute squamellose cup: akenes barely 3 mm. long, spreading-hirsute. — *P. punctata*, Rose, Contrib. U. S. Nat. Herb. i. 105, not Jacq. — SONORA, common on stony ridges, Alamos (Palmer, September, 1890, no. 730).

§ 3. PECTOTHRIX, Gray. Pappus of many (10 or more) capillary bristles, at least in the disk-flowers (or in *P. papposa* rarely reduced to a mere crown), a few of them sometimes enlarged but hardly paleaceous. — Pl. Fendl. 62, Pl. Wright. i. 83 & Proc. Am. Acad. xix. 47. *Cryptopetalon*, Cass. Bull. Soc. Philom. janvier, 1817, & Dict. Sci. Nat. xii. 123. *Lorentea*, Less. Linnæa, v. 135, in part; DC. Prodr. v. 101, in part; Gray, Pl. Wright. i. 83, in part [as section].

* Erect or suberect plants with ascending or spreading branches and ascending rigid leaves.

+ Annual, branching mostly above the middle.

P. elongata, HBK. Stems rather stiff, purplish, simple below, with ascending or spreading branches; stems subterete, smooth, the branches slightly tetragonous: leaves linear, submucronate, smooth or scabridu-

lous above, 1½ to 4½ cm. long, 1½ to 3 mm. wide, with 4 or 6 irregular rows of conspicuous glands beneath, and 4 to 10 pairs of basal setæ: heads scattered or subcorymbose toward the tips of the upper branches; the slender peduncles ½ to 2 cm. long, generally with 2 approximate submedian bracts and often a third one above: involucre 5-bracteate, 5 mm. high, 10–12-flowered; the purplish bracts linear, acuminate, glabrous: rays small, yellowish: pappus 10–25 (sometimes reduced even to 3 or 4) upwardly scabrous unequal rufescent bristles slightly or not at all dilated below, the longest about 4 mm. long: akenes compressed, 2 to 2½ mm. long, setulose with rufescent hairs. — Nov. Gen. et Spec. iv. 262, t. 392; DC. Prodr. v. 99; Baker in Mart. Fl. Bras. vi. pt. 3, 288; Hieronymus in Engler, Bot. Jahrb. xix. 60. *P. stricta*, Willd. in Less. Linnæa, vi. 710, in syn. *Lorentea polycephala*, Gardn. in Hook. Lond. Journ. Bot. v. 240 *fide* Baker l. c. — A common South American species extending north to Guatemala. GUATEMALA, Chupadero, Depart. Santa Rosa (Heyde & Lux in Exsic. J. D. Smith, no. 3806); PANAMA (Seemann). Both these specimens have the pappus-bristles greatly reduced in number, but otherwise they seem identical with the true South American plant as figured with the original description. A specimen from Nicaragua (Chas. Wright) which Dr. Gray thought might be a form of *P. Berlandieri*, is too old for determination, but it may belong here.

Var. Schottii. Much more slender with very slender diffuse branches and small leaves: heads scattered and solitary in the axils, on capillary 3–4-bracteate peduncles 2 or 3 cm. long: involucre pale, 4 mm. high: pappus hardly equalling the akene. — YUCATAN, Maxcanu (Schott, 1865, no. 666). Type in Herbarium of Field Columbian Museum.

+ + Perennial, stems suberect branching from near the base.

P. diffusa, Hook. & Arn. A decimeter or so high, with a few suberect branches rising from the slightly suffruticose base, these branches simple or with short densely leafy branchlets above; stems angulate or subterete, smooth or puberulent, densely clothed with ascending leaves: leaves linear, thick, submucronate, with prominent midribs, smooth or scabrous on both surfaces, the larger 3 or 4 cm. long, 2½ or 3 mm. wide, with or without 2 or 4 irregular rows of dots beneath, and with 5 to 10 pairs of setæ below the middle (setæ reduced or sometimes wanting on the upper leaves): peduncles capillary, from the upper axils, 1 to 4 cm. long, with 2 to 6 scattered subulate-ovate bracts: involucre 4 to 6 mm. high, of 5 oblong acutish or obtuse bracts, 10–12-flowered: rays linear-oblong, yellow, 6 or 7 mm. long: pappus of 10 to 20 (rarely only 4 or 5)

very unequal setiform bristles, the longer a little or not at all dilated below, and often with an exterior series of minute setæ at the base: akenes short-setose or glabrate. — Bot. Beech. 296; Gray, Pl. Fendl. 62, excl. syn. & Proc. Am. Acad. xix. 47, in part; Hemsley, Biol. Centr.-Am. Bot. ii. 225, in part; Rose, Contrib. U. S. Nat. Herb. i. 338. *P. Taliscana*, Benth. Pl. Hartw. 121, not Hook. & Arn. *fide* Hemsl. l. c. — Southwestern Mexico. JALISCO (Beechy in Hook. & Arn. l. c.), Rio Blanco (Palmer, 1886, no. 4), dry rocky hills near Guadalajara (Pringle, no. 1814); COLIMA, common on river banks at Colima (Palmer, 1891, no. 1155). Gregg's no. 967 (no locality given) is doubtless the same thing. The pappus of this as well as the last species is very variable in the number of bristles, which are sometimes reduced to 3 or 4, thus forming a transition to § *Pectidopsis*. The Nicaragua and Panama specimens referred here by Hemsley are more likely *P. elongata*.

* * More diffusely branched from near the base: leaves less rigid and more spreading: heads small or middle-sized.

+ Annuals, the pappus mostly barbellate-setose (in *P. papposa* sometimes reduced to a mere crown).

P. papposa, Harv. & Gray. Stems smooth, much-branched, the divergent branches 3 dm. or less in length: leaves fleshy, narrow-linear, 1 to 6 cm. long, 1 or 2 mm. wide, rarely with a few sharp lobes, bearing 2 rows of prominent marginal glands and 2 to 5 pairs of basal setæ: heads subfastigiate, or subcorymbose on slender 1–3-bracteate peduncles 2 or 3 cm. long, the bracts often glandular: involucre 4½ to 7 mm. high, about 20-flowered; the 7 to 9 linear strongly involute obtusish bracts more or less punctate: rays yellow, 4 to 8 mm. long: disk-pappus 12 to 20 unequal generally barbellate-setose bristles, 4 mm. or less in length, or sometimes reduced to a mere auriculate crown; ray-pappus a squamellose or auriculate crown, rarely with 1 or 2 slender awns, or even obsolete: akenes 3 or 4 mm. long, hispidulous or strigose with minute uncinate or capitate bristles. — Harv. & Gray in Gray, Pl. Fendl. 62; Gray, Pl. Wright. ii. 69, in Torr. Bot. Mex. Bound. 73 & Syn. Fl. i. pt. 2, 361; Hemsley, Biol. Centr.-Am. Bot. ii. 226. *P. tenella*, Rothr. in Wheeler, Rep. vi. 171, not DC. *P. Palmeri*, Wats. Proc. Am. Acad. xxiv. 58, as to Palmer's no. 655. — Sandy or gravelly soil, Southwestern United States to Sonora and Lower California. NEW MEXICO, Doña Ana (C. Wright, no. 1126), Camp Bowie (Rothrock, no. 446), Deming (G. M. Kellogg); ARIZONA (S. Hayes, no. 342), Fort Whipple (Coues & Palmer, no. 522[a]), Yuma (Pringle, no. 322), Maricopa (Pringle, no. 123), Tucson (Toumey, no. 675); CALIFORNIA (Coulter, no. 331),

San Diego Co. (Palmer, 1875, no. 200), El Rio (Lemmon, no. 78); Sonora, Valley of the Cocospera (Schott), Guaymas (Palmer, 1887, no. 655); Lower California, San Gregorio (Brandegee). Said to be lemon-scented.

P. Palmeri, Watson. A little stouter than the last: leaves mostly broader and thinner, about 4 cm. long, 2 to 4 mm. wide, with 1 or 2 short basal setæ: peduncles thicker, longer, scattered, 3 to 8 cm. long, 3–8-bracteate: involucre 5 to 6 mm. high, 35–50-flowered; the bracts plane, keeled below the middle: disk-pappus as in the last or merely scabrous; ray-pappus of 2 or 3 slender aristæ 3 mm. long, somewhat dilated at bases: akenes 4 mm. long, strigose with clavellate, not uncinate or capitate, hairs. — Proc. Am. Acad. xxiv. 58; Rose, Contrib. U. S. Nat. Herb. i. 338. — On foothills and in rich soil along streams, Sonora and Lower California. Sonora, Guaymas (Palmer, 1887, nos. 652, 653), Agiabampo (Palmer, 1890, no. 765); Lower California, Purissima, 1889 (Brandegee), La Paz (Palmer, 1890, no. 115). The Lower Californian plants are smaller and with fewer-flowered heads than the original Sonora specimens, but otherwise they are the same.

+– +– Perennials or rarely annuals, the pappus merely scabrous.

P. stenophylla, Gray. Very diffusely branching from a suffruticose base, the branches purplish, slender, glabrous, 2 or 3 dm. long: leaves narrowly linear, mucronate, 3 or 4 cm. long, 2 mm. wide, or generally strongly revolute and scarcely 1 mm. wide, bearing two rows of marginal glands and 2 or 3 pairs of long slender basal setæ: heads scattered toward the tips of the branches; the filiform 4–6-bracteate peduncles becoming 5 or 6 cm. long: involucre 5 mm. high, 15–18-flowered; the 8 narrowly oblong bluntish bracts plane above, slightly keeled below the middle: rays yellow, narrow: disk-pappus of 20 to 40 unequal upwardly scabrous capillary bristles 2 mm. or less in length; ray-pappus 2 slender smooth or minutely scabridulous awns 1½ mm. long, slightly dilated below: akenes 2½ to 3 mm. long, sparingly pubescent with short clavellate hairs. — Proc. Am. Acad. xxi. 393. — Hillsides and dry soil, Northern Mexico. Chihuahua, Batopilas (Palmer, 1885, no. 81); Sonora, Arroyo Hondo (Hartman, no. 216, in part), Badehuachi (F. E. Lloyd, no. 402). Said to be aromatic.

P. Hænkeana, Schz. Bip. Perennial from a suffruticose base, or annual, the stems puberulous or pubescent, ascending or somewhat depressed, the longest 2 dm. in length: leaves pale green, linear or spatulate-linear, mucronate, 1 to 2½ cm. long, 1½ to 4 mm. wide, smooth or

slightly pubescent on both surfaces, slightly revolute, entire, or rarely obscurely pinnatifid at the base of the 2 to 5 scattered setæ, faintly punctate-dotted in 2 or 4 lines: peduncles axillary or terminal, capillary, 1 to 3 cm. long, 2–5-bracteate: involucre 5 mm. high, 25–30-flowered, the 5 oblong obtuse plane bracts smooth, ciliate at the tips, faintly marked with elongate glandular dots: rays ovate-oblong, 4 mm. long: pappus clear-white, in the disk of 5 or 6 elongate scabrous setæ $3\frac{1}{2}$ to 5 mm. long, and many unequal shorter capillary ones; in the ray generally fewer: akenes 3 or 4 mm. long, setose or glabrate. — Sch. Bip. in Seem. Bot. Voy. Herald, 309; Gray, Proc. Am. Acad. xix. 47. *P. capillipes*, Hemsley, Biol. Centr.-Am. Bot. ii. 225. *Lorentea Hænkeana*, and varieties, DC. Prodr. v. 102. *L. capillipes*, Benth. in Œrsted, Vidensk. Meddel. 1852, 70. — Mexico (Hænke *fide* DC.); Oaxaca, San Antonio (Pringle, no. 5760), Cuicatlan (Nelson, no. 1598, L. C. Smith, no. 422). Nicaragua, Segovia (Œrsted *fide* Benth. l. c.). Without authentic specimens, it is impossible from the description alone to distinguish Bentham's plant from De Candolle's. In the Oaxaca material, which is apparently all the same species, the suffruticose character is found only in Mr. Pringle's plant.

* * * Perennials, the stems subsimple or sparingly branched, mostly decumbent or procumbent from woody or suffruticose bases, rarely ascending with subsimple branches above: heads many (30–90)-flowered.

P. longipes, Gray. The glabrous slender densely leafy stems forming tufts or depressed mats, including the long scape-like peduncles $1\frac{1}{2}$ or 2 dm. high: leaves thickish, linear, mucronate, 2 to 4 cm. long, $1\frac{1}{2}$ to 3 mm. wide, bearing conspicuous marginal glands and 2 or 3 pairs of basal setæ: peduncles 6 to 14 cm. long, naked or few-bracteate: involucre broadly campanulate, 6 or 8 mm. high, 50–90-flowered; the 12 or 15 plane linear acutish bracts each bearing a large apical gland and rarely one or two toward the base: rays bright yellow, narrowly oblong, 1 cm. or less in length; disk-pappus 20 to 40 very unequal subbiseriate capillary upwardly scabrous bristles, the longest 4 to 6 mm. long, the shorter outer ones generally more slender; ray-pappus 2 slender setulose awns 3 to 5 mm. long, and rarely a few reduced bristles at the base: akenes 4 or 5 mm. long, more or less pubescent with short recurved unequally bidentate hairs. — Pl. Wright. ii. 69, in Torr. Bot. Mex. Bound. 73, in part, & Syn. Fl. i. pt. 2, 361; Hemsley, Biol. Centr.-Am. Bot. ii. 226, in part; Rose, Contrib. U. S. Nat. Herb. i. 122. — Mesas and mountain sides, Southwestern Texas (Coulter, Contrib. U. S. Nat. Herb. ii. 238) to S. Arizona and adjacent Mexico. Arizona, between the San Pedro

and Santa Cruz (C. Wright, no. 1127), Apache Pass (Lemmon), Foothills of Santa Rita Mts. (Pringle), Fort Huachuca (Palmer, 1890, no. 425); SONORA, Santa Cruz and Babocomori (Thurber, no. 996), Sonoyta valley (Rothrock, no. 635); CHIHUAHUA, San Diego (Hartman, no. 609).

P. canescens, HBK. Stems glabrous or puberulous or more or less canescent-hirtellous, from a few centimeters to 3 dm. in length: leaves rather rigid, linear or linear-oblong, acute, mucronate, 1 to 2½ cm. long, 1 to 4 mm. wide, minutely punctate, entire or pinnatifid-dentate, with 2 to 10 pairs of setæ: peduncles terminal, slender, 1 dm. or less in length, 4–10-bracteate: involucre 6 to 8 mm. high, about 40-flowered; the 5 to 9 lanceolate to spatulate-obovate smooth plane bracts blunt or rounded at the ciliate tips, usually glandless and prominently keeled toward the bases: rays lance-oblong, yellow, 6 or 8 mm. long: disk-pappus 20 to 30 unequal rufescent mostly capillary setæ, a few of the longest somewhat stouter, 6 or 8 mm. long; ray-pappus as in the disk or of fewer setæ (*latisquama*), or reduced to a few subulate squamellæ (*canescens*), or auriculiform (*auricularis*), or entirely wanting (*saturei-oides*): akenes 6 mm. long, spreading-hirsute. — Nov. Gen. & Spec. iv. 263, t. 393, Gray, Proc. Am. Acad. xix. 47. *P. longipes*, Hemsley, Biol. Centr.-Am. Bot. ii. 226 (as to Berlandier plant), not Gray. *P. multifloseulosa*, Hemsl. l. c. not Schz. Bip. *Inula Saturejaoides*, Mill. Dict. ed. 8; *I. saturejoides*, Willd. Sp. Pl. iii. 2104; *I. Satureiæ*. Spreng. Syst. iii. 520. *Aster Saturejæ*, Banks in Reliq. Houst. 8, t. 19. *Lorentea saturejoïdes*. Less. Linnæa, v. 135 & vi. 718; DC. Prodr. v. 102 (*satureioides*). *L. canescens*, Less. l. c. vi. 718; DC. l. c. *L. auricularis* & var. *Acapulcensis*, DC. l. c. *Stammarium hyssopifolium*, Willd. in Less. Linnæa, v. 135, in syn. *Lorentea multifloseulosa*, DC. (Prodr. v. 102) is probably referable here. It is not, according to Bentham and Hooker f., or Klatt, the *Pectis multifloseulosa*, Schz. Bip. (see note under *P. arenaria*); and from De Candolle's description and note it seems very near if not quite *P. canescens*. A drawing, kindly furnished by Mr. Thiselton-Dyer, of Œrsted's Guanacaste plant (see Benth. in Œrsted, Vidensk. Medd. 1852, 70) shows that plant to be a form of *P. canescens* (*latisquama*). — Dry ground, mostly in the mountains, Central Mexico to Costa Rica. SAN LUIS POTOSI, near Sta. Maria (Schaffner, no. 370), between San Luis Potosi and Tampico (Palmer, 1878–79, no. 1097); NUEVO LEON (Berlandier, no. 3159); VERA CRUZ, near Vera Cruz (Houston *fide* Banks, l. c.), Wartenberg, near Tantoyuca (Ervendberg, no. 63); PUEBLA, Tehuacan (Galeotti *fide* Hemsl.); MEXICO, Valley of Mexico (Schaffner, no. 85), near Santa Fé (Schiede

& Deppe *fide* Lessing); Jalisco, Tequila (Palmer, 1886, no. 418); Oaxaca (Galeotti *fide* Hemsl.); Guerrero, Chilpancingo (Humboldt & Bonpland *fide* HBK.), Acapulco (Hænke *fide* DC.); Nicaragua (C. Wright); Costa Rica, Guanacaste (Ersted).

Var. villosior, Coult. Low with thick woody caudex: stems and leaves villous or even lanate; the involucral bracts puberulous or villous. — Bot. Gaz. xx. 52. — Oaxaca, between Tatolapa and San Carlos (Nelson, no. 2550); Guatemala, Santa Rosa (Heyde & Lux in Exsic. J. D. Smith, nos. 3401, 3413).

P. Liebmannii, Schz. Bip. Suffruticose at base, the elongated slender procumbent branches 2 or 3 dm. long, the whole plant including leaves and involucre canescent-tomentose or even lanate on the young parts: the thick obovate-oblong revolute leaves cuspidate-mucronate, about 2 cm. long, 1 cm. or less wide, punctate beneath, with many small black dots, and 2 to 4 (according to Klatt 6 or 8) long basal setæ: peduncles solitary, terminal or axillary, 6 mm. or less long, 2–3-bracteate: involucre 6 or 7 mm. high, about 30-flowered; the 6 or 8 linear-oblong rosy-tipped bracts plane or somewhat involute, scarious on the margins, canescent on the back, and slightly thickened below: rays yellow, ovate-lanceolate, 3 or 4 mm. long: disk-pappus 20 or 30 unequal sordid upwardly scabrous setæ, the longest 4 or 5 mm. long; ray-pappus wanting: akenes narrowly fusiform, 3 or 4 mm. long, minutely pubescent or glabrate. — Schz. Bip. in Hemsley, Biol. Centr.-Am. Bot. ii. 226 & in Klatt, Leopoldina, xx. 92 (reprint 5). Southwestern Mexico. "Lag. Lapotengo" (Liebmann, no. 471 *fide* Klatt l. c.); Jalisco, San Augustin (Liebmann, no. 467).

* * * * Aquatic subsimple plant with naked leaves and subsessile heads.

P. aquatica, Watson. Stems smooth, elongated, simple, or sparingly branched; leaves few, mostly above, thick, linear, entire, blunt, 2 or 3 cm. long, rarely with a few faint marginal glands: heads solitary in the axils, becoming recurved with age: involucre about 1 cm. high, of 5 imbricated flat obtuse purple-tipped blunt bracts, about 12-flowered, the flowers mostly included: rays none: pappus of 10 or 12 unequal serrulate bristles, the longest 2 mm. long and somewhat thickened, all ascending or converging at the tips: akenes compressed-angulate, very slender, 8 mm. long, with a long-attenuate base, appressed-setose with rufescent hairs. — Proc. Am. Acad. xxiii. 279. Chihuahua, pine plains, base of Sierra Madre (Pringle, no. 1296). A unique species, the stems floating in ponds.

§ 4. HETEROPECTIS, Gray. Low diffuse puberulent plants with setiferous leaves: rays bright yellow: pappus of corneous subulate divergent retrorsely barbed awns (or reduced in the disk to a mere crown of rigid squamellæ). — Pl. Wright. i. 83. *Pectis* § *Pectidium*, Gray, Proc. Am. Acad. xix. 48, in part.

* Leaves thick, serrulate, the teeth and the tip continued into long setæ.

P. multiseta, Benth. Annual, stouter than the related species, 3 dm. or less high: leaves with slightly revolute margins, lanceolate, 1 to 2½ cm. long, the lower surfaces covered with scattered large glands and smaller punctate dots: peduncles becoming 3 cm. long: involucre 4½ mm. high, 20–25-flowered, of 5 obovate-cuneate punctate and ciliate bracts: rays 6 mm. long: awns unequal in length (2 mm. or less), in the ray-flowers 3, in the disk-flowers 1 or 2, or the pappus reduced to a mere crown of more or less connate squamellæ: akenes 3 or 4 mm. long, pubescent with long somewhat capitate hairs. — Bot. Sulph. 20. — LOWER CALIFORNIA, Cape St. Lucas (Hinds *fide* Bentham, l. c. Xantus).

* * Leaves thinner, setiferous only below the middle.

P. Coulteri, Harv. & Gray. Annual or perennial (?), slender, very diffuse and branched, 2 dm. or less in height: leaves narrowly linear, usually with revolute margins, 3 cm. or less in length, generally with 2 rows of glands on the lower surfaces; setæ restricted to the subpinnatifid basal half of the leaf: peduncles varying in length from 3 or 4 mm. to 3½ cm.; involucre cylindraceous, 12–20-flowered, 5 to 7½ mm. high, of 5 (or by exception 6) linear-oblong often glandular-dotted ciliate bracts: rays 5 to 7 mm. long: awns somewhat unequal in length, in the rays 3 to 6, in the disk 2 to 5 (generally 3 or 4), about 1½ mm. long: akenes slender, 4 or 5 mm. long, strigose-pubescent with capitate hairs. — Harv. & Gray in Gray, Pl. Fendl. 62; Watson, Proc. Am. Acad. xxiv. 58. — On sandy plains, Arizona to the Sonora coast, "California," i. e. probably on the Gila River [1] (Coulter, no. 330); ARIZONA (Palmer), Sonora Alta (Coulter, no. 441 *fide* Hemsley); SONORA, Guaymas (Palmer, 1887, nos. 143, 654, 1890, no. 759). Dr. Palmer's Sonora specimens are much more vigorous throughout than the earlier-collected specimens from the Arizona desert region, but, except in size, the plants seem to be the same.

P. ambigua. Annual, similar in habit to *P. Coulteri*, but smaller. 1 dm. or less in height: leaves thin, entire, linear or spatulate-linear, flat,

[1] Coville, Bot. Gaz. xx. 528.

barely 1 cm. long, with the glandular dots irregularly scattered over the lower surfaces, and with only 1 or 2 pairs of basal setæ: peduncles 2 to 7 mm. long: involucre oblong, 10–12-flowered, 3 or 4 mm. high, of 5 linear-oblong more strongly costate glandular-dotted bracts: rays 3 or 4 mm. long: pappus of the ray-akenes three awns, the longest 1 mm. long, of the disk-akenes a minute squamellose crown: akenes 3 mm. long, sparingly pubescent with capitate hairs. — *P. multiseta*, Vasey & Rose (misprinted *multisecta*), Contrib. U. S. Nat. Herb. i. 72, not Benth. — Lower California, San Gregorio (Brandegee, 1889), common on sandy mesas, La Paz (Palmer, 1890, no. 23).

§ 5. Pectidium, Gray. Erect glabrous plants with the leaves entire, naked or sparingly setiferous at base: rays white or whitish becoming purple: pappus of rigid smooth awns with or without a few aristiform paleæ and squamellæ, or reduced to a crown of corneous squamellæ, or even obsolete. — Pl. Wright. i. 83, & Proc. Am. Acad. xix. 48, in part. *Pectis*, Cass. in Dict. Sci. Nat. xxxviii. 202. *Pectidium*, Less. Linnæa, vi. 706.

* Slender annuals with thin leaves sparingly setiferous at base (very rarely naked): rays 1 or 2 mm. long: pappus consisting only of 2 or 3 corneous smooth (rarely a little denticulate) subulate divergent awns. — *Pectis*, Cass. l. c. *Pectidium*, Less. l. c.

P. linifolia, L. Rather tall and slender, 3 to 9 dm. high, paniculately branched: leaves plane or slightly revolute, linear or linear-lanceolate, the largest 5 or 6 cm. long, 5 mm. wide, dark green above, glaucous beneath and covered with many small round glands, with larger elongated ones along the margin: peduncles becoming 2 or 3 cm. long, with 1 or 2 minute bracts above the middle: involucre glabrous or minutely puberulent, 5 or 6 mm. high, 6–9-flowered, of 4 or 5 narrow linear blunt bracts, marked longitudinally with black glands and soon becoming involute: awns 2 or $2\frac{1}{2}$ mm. long: akenes minutely puberulent or glabrate, 4 mm. long. — Syst. Nat. ed. 10, 1221 (Sloane, Hist. Jam. t. 149, f. 3) & Amœn. Acad. v. 407 (*Tagetes* ? 2, Browne, Jam. 319); Gærtn. Fruct. t. 171; Lam. Ill. t. 684; Cass. l. c. *P. punctata*, Jacq. Enum. Pl. Carib. 28 & Stirp. Amer. 216, t. 128; L. Spec. ed. 2, 1250; Swartz, Obs. 308; Cass. in Dict. Sci. Nat. l. c.; Gray, Syn. Fl. i. pt. ii. 362. *Pectidium punctatum*, Less. Linnæa, vi. 707; DC. Prodr. v. 98. — Yucatan (Gaumer, no. 887); Lower California, Cape St. Lucas (Xantus, no. 45). Common in the West Indies and reported from Venezuela and Galapagos.

Var. marginalis. More slender than the type, ascending, not so tall (the tallest about 4 dm. high): leaves pale green with remote orange-

red oblong marginal glands (very rarely a few glands scattered on the lower side of the leaf): heads a little longer than in the type: awns 2 mm. long: akenes 6 or 7 mm. long. — *P. punctata*, Wats. Proc. Am. Acad. xxiv. 58, not Jacq. — In shaded ravines and on mountain bluffs, Southern Arizona to the Sonora coast. ARIZONA (Palmer, 1867, no. 129), Tuscan (Smart, no. 382), Santa Catalina (Lemmon, no. 3031), Malpais Mts. (Pringle); SONORA, Guaymas (Palmer, 1887, no. 224).

* * Rigid glaucous perennial with ligneous root: leaves entirely without setæ: rays 6 to 9 mm. long: pappus various, erect, not divergent, the aristiform pales, when present, generally minutely serrulate.

P. imberbis, Gray. Stems sulcate, 3 to 9 dm. high, paniculately branched, sparingly leafy and junciform: leaves thick, linear, with revolute margins, the longest 6 or 7 cm. long, channelled above, and with the midrib very prominent beneath; lower surfaces with two rows of scattered elongated dark glands: peduncles about 2 cm. long, with a few linear-subulate bracts, especially toward the tips: involucre cylindrical, 7 or 8 mm. high, 10–12-flowered, of 5 or 6 linear blunt soon involute bracts marked with linear dark glands: disk-corollas with five longitudinal purplish stripes along the tube and with a conspicuous dark gland at the tip of each lobe; rays with or without one or two small glandular dots: akenes puberulent, 5 or 6 mm. long.— Pl. Wright. ii. 70 & in Torr. Bot. Mex. Bound. 73; Rothrock in Wheeler Rep. vi. 172. — Southern Arizona and adjacent Mexico. ARIZONA, near Fort Huachuca (Lemmon, no. 2783); SONORA, Sonoyta Valley (Wright, no. 1399, Rothrock, no. 636). CHIHUAHUA, Janos (Schott). Said to have a strong terebinthine odor.

II. — SOME RARE AND UNDESCRIBED PLANTS COLLECTED BY DR. EDWARD PALMER, AT ACAPULCO, MEXICO.

SCLERIA LITHOSPERMA, Willd., var. FILIFORMIS, Britton, Ann. N. Y. Acad. Sc. iii. 231. Forming tussocks among underbrush on hills above Acapulco, November, 1894 (no. 76). Common in South Florida and the West Indies, the type occurring in Southern Asia and Australia.

Ruprechtia fusca. A tree about 4½ m. high, the trunk 2 dm. in diameter: bark of the slender branches pale brown, puberulent or glabrate, somewhat sulcate and verrucose: ochræ cylindric, puberulent, 7 mm. long, soon deciduous: leaves obovate, 5 to 9 cm. long, 2½ to 4½ cm. broad, coriaceous, on thickish petioles 3 to 6 mm. long, below subcuneate,

above blunt or rounded, or short-acuminate to a blunt tip; the margins undulate and revolute; upper surfaces minutely puberulent, lower densely fuscous-pubescent, except on the glabrate and slightly verrucose midribs; the veins above strongly impressed, beneath, with the strongly reticulating veinlets, prominent, meeting the midrib at an angle of 45 degrees: racemes, with the bracts, short fuscous-pubescent, lateral in sessile fascicles 4 or 5 cm. long, in fruit densely covering the leafless branches: fruiting pedicels slender, villous, 4 mm. long, articulated above the middle: the outer fruiting calyx 3 cm. long, dividing 2 mm. above the middle into three spatulate-linear reticulated wings, appressed-pubescent below, the wings becoming glabrate toward the tips; inner calyx-lobes linear-subulate, glabrous, about 4 mm. high, closely appressed to the deeply sulcate faces of the akene: akene narrowly ovate, acuminate, 7 mm. long, appressed-villous; below terete, with broad rounded angles and deeply sulcate faces; above sharply angulate; persistent styles 1 mm. long, equalling the linear stigmas. — Collected on rocky hillsides, January, 1895 (no. 511). A species in some ways suggesting *R. Cumingii*, Meissn., but apparently well distinguished from that species by its smaller obovate pubescent leaves, and its fascicled longer racemes.

Acalypha Indica, L. Spec. 1003. Common about shady walls and buildings and along stony arroyos, November, 1894 (no. 46). Perhaps introduced; native in Southern Asia and Tropical Africa.

Acalypha Acapulcensis. A very slender shrub; the dark brown bark finely appressed-pubescent: stipules subulate, 1 mm. long, tipped by a pair of minute white hairs: leaves 2 to 4 cm. long, ovate or ovate-lanceolate, acuminate at the tip, rounded or subcuneate at the base, pinnately veined, minutely pruinose above, and appressed-pubescent on the veins beneath, rather coarsely crenate-dentate; on slender petioles $\frac{1}{3}$ to $\frac{1}{5}$ as long: spikes monœcious, axillary, pubescent; the staminate spikes very slender and short-peduncled (sometimes with one or two pistillate flowers at the base), 2 cm. or less long, 1 mm. thick, the minute flowers hispid; pistillate spikes sessile, becoming 3 cm. long, with 6 to 9 scattered bracts: bracts 2-flowered, reniform, 4 mm. long, 5 or 6 mm. broad, with 16 crenate teeth: the three red styles each deeply cut into 4 or 5 segments: capsule hispid; seed ovate, minutely puncticulate, 1 mm. long. — In shady river-bottoms and depressions in the mountains, November, 1894 (no. 190).

Lucuma Palmeri. A shrub, $1\frac{1}{2}$ to 3 m. high; the reddish brown bark of the young branches appressed-pubescent with ferruginous hairs, becoming glabrate: leaves dark green, ferruginous-pubescent when young,

soon becoming glabrate and shining above, scarcely paler beneath, oblanceolate or narrowly obovate, subcuneate at the base, obtuse, rounded or even retuse at the apex, 6 to 12 cm. long, 2½ to 5½ cm. broad, the veins prominent beneath, the veinlets inconspicuously reticulated; petioles appressed-pubescent, 9 to 15 mm. long: flowers solitary or in clusters of 2 or 3, above the axils; peduncles appressed-pubescent, 1 or 2 cm. long: sepals 5, suborbicular, obtuse, imbricated, ferruginous-pubescent, 5½ mm. long: corolla twice as long as the calyx, cylindric-campanulate, deeply cleft into 5 (or 7) oblong obtuse lobes, puberulent, and appressed-ferruginous outside: stamens and staminodia equally inserted at the top of the corolla-tube, the stamens on short filaments equalling the anthers; the staminodia linear-subulate, about equalling the stamens: ovary pubescent, 5-celled: fruit short-oblong or globular, 3 cm. long, sinuately 5-lobed (by abortion 4- or even 1-locular), yellow when ripe; seed 2½ cm. long, ellipsoidal, laterally compressed, the testa straw-colored and shining, the ventral hilum elongated-oblong. — Acapulco, January, 1895 (no. 386). Called "Huicon," and the yellow fruit eaten. The seed places this plant in De Candolle's section *Guapeba*, but the 5-parted calyx and corolla throw it out of that section and place it near *L. Rivicoa*, Gærtn., or *L. nervosa*, DC., in neither of which, however, is the seed laterally compressed. Dr. Palmer's no. 1346 from Manzanillo, described by Dr. Rose without a name (Contrib. Nat. Herb. i. 339), may be a form of this species with much longer leaves and petioles.

MABA ALBENS, Hiern, Trans. Camb. Phil. Soc. xii. 126. A shrub 2 or 3 m. high: stems few, about 2½ cm. in diameter, covered with smooth pale bark: branches covered with rough reddish-brown bark: leaves subcoriaceous, alternate, broadly oblanceolate, 5 to 9 cm. long, 2 to 3 cm. broad, blunt or rounded at the apex, tapering below to a short petiole a line or so long, minutely strigillose-pubescent beneath, above puberulous, becoming smooth and shining; margins entire, revolute; midribs slightly depressed above, prominent beneath: fruit solitary on thick peduncles 2 mm. long, subglobose, 2 or 3 cm. in diameter, minutely appressed-pubescent, especially about the persistent base of the style; skin thin, greenish yellow; pulp edible: seeds 6, about 1½ cm. long, 8 mm. broad, and 6 mm. thick; albumen equable: fruiting calyx spreading, 1½ cm. across, 3-fid, densely appressed-pubescent within, sparingly so without; lobes broadly ovate, 6 to 9 mm. broad, the margins and tips recurved. — Acapulco, January, 1895 (no. 372). The yellow fruit eaten under the name "Coacollutillo." *Maba albens* has been known only from the flowering specimens, and Dr. Palmer's plant has therefore

been placed there with some hesitation. The oblanceolate slightly pubescent old leaves, the pubescent calyx and fruit, and the pallid bark, agree very well with that species. *Maba albens*, however, is described as having dull green leaves when young and the midrib depressed beneath. In these fruiting specimens the leaves are glossy above and the midribs prominent beneath.

Evolvulus commelinifolius. An annual plant with sparingly branched lignescent stems 3 to 5 dm. high: stems and both sides of the leaves densely rufous-hispid and villous: lowest stem-leaves oblong, subsessile, blunt at the apex, acutish or rounded at the base, 4 or 5 cm. long, the upper gradually decreasing in size; floral-leaves becoming approximate, distichous, conduplicate, broadly deltoid-ovate, with deeply cordate bases, the lowest 4 cm. long, and 2½ cm. broad, the upper barely 1½ cm. long: flowers solitary, axillary, on very short peduncles: sepals lance-subulate, 6 mm. long, white with setose-hispid pubescence: corolla pale blue with white stripes, 13 mm. high: capsule obovate; seed olive-green with minute black dots. — Shady places in the mountains and river-bottoms, December, 1894 (no. 312).

Evolvulus ovatus. A prostrate much-branched plant: stems slender, 3 dm. long, densely silky-villous: leaves ovate, or oblong-ovate on the branchlets, acutish, subsessile, with cordate bases, silky-villous on both sides, 7 to 13 mm. long, 4 to 9 mm. wide, closely approximate, or even imbricated, toward the ends of the branches: flowers axillary, solitary, on very short peduncles: sepals densely villous, lanceolate, 4 to 7 mm. long: corolla blue, scarcely exceeding the calyx: capsule depressed-globose; seed smooth. — On a shady hillside, December, 1894 (no. 313). Near *E. holosericeus*, HBK., and *E. discolor*, Benth., but distinguished from them by the broader leaves with the upper surfaces pubescent.

Ipomœa (Pharbitis) ampullacea. A stout woody vine climbing high over trees and shrubs; the pale brown bark covered with appressed retrorse hairs: leaves broadly ovate or suborbicular, 7 to 15 cm. broad, deeply cordate at bases, short-acuminate, acute, or even obtuse, entire or shallowly 3-lobed, the lateral lobes blunt, strigose-pubescent, especially on the pale lower surface; the veins prominent beneath; petioles retrorse-strigose, ½ to 1 dm. long: peduncles stout, equalling or exceeding the leaves, puberulent toward the tips, branching into a loose cyme: pedicels 1 or 2 cm. long, thickened upward, generally bearing an oblong tuft of dense matted hairs: bracts strigose-pubescent, ovate-lanceolate, blunt, 1¾ cm. long: calyx strigose-pubescent; sepals coriaceous, unequal, the two outer much larger than the inner, 2½ to 4 cm. long, the

body ovate, narrowed above to an elongated lanceolate or linear tip: corolla white, narrowly campanulate, 6 cm. long, strigose-pubescent in broad bands without: stamens hardly equalling the corolla, the filaments somewhat dilated below and pubescent with loose spreading hairs: ovary glabrous; the style slender, equalling the corolla; stigma 3-lobed: capsule depressed-ovoid, 1½ cm. high, 3-celled, 6-seeded; seed ovate, 6 or 7 mm. long, covered with short ferruginous pubescence. — A very showy plant, growing in low places among the mountains, January, 1895 (no. 483).

Ipomœa Palmeri, Watson, var. platyphylla. Leaves larger than in the type, the largest leaflets ovate-lanceolate, 1 dm. long, 3 cm. wide: peduncles bearing 1 to 3 dull-white nocturnal flowers: seeds oblong or oblong-ovate, 10 to 13 mm. long, more densely black-pubescent than in the species. — In high valleys among the mountains, January, 1895 (no. 415).

Ipomœa filipes, Benth. ex Meissn. in Mart. Fl. Bras. vii. 274. A dainty little vine with minute yellow flowers. Among underbrush on high hills, and along arroyos, November, 1894 (no. 109).

Convolvulus secundiflorus. A delicate vine; stems twining, covered with scattered pilose hairs: leaves elongated, ovate-lanceolate, long-acuminate, deeply cordate, glabrous or granular-pubescent, with thin whitish and pilose margins, 2 to 4 cm. long, on pilose petioles 5 to 13 mm. in length: the 2–3-flowered racemes axillary, secund: the glandular peduncles 1½ to 3½ cm. long: bracts minute, subulate: pedicels glandular, 4 to 9 mm. long: calyx glandular and pilose without, 3 mm. long in flower, becoming elongated to 4 or 5 mm. in fruit; sepals elongate-lanceolate with subulate muriculate tips: corolla blue, glabrous, 9 mm. high, with the 5 angles acuminate: stamens unequal, the three longest 4½ mm. high, and equalling the style: stigma linear-oblong: seed pale brown, muriculate, barely 2 mm. long. — Among grass in the town, October, 1894 (no. 32).

Cordia (Dasycephalæ) perlonga. A shrub with very hard fine-grained wood, the dark brown bark dotted with orbicular or oblong white lenticels: young branches appressed-hispidulous and villous: leaves short-petioled, lanceolate, acuminate, coarsely and unequally serrate above the cuneate entire bases, 6 to 9 cm. long, 1½ to 2½ cm. broad; above dark green, appressed tuberculate-hispid; beneath white-villous, appressed-hispid on the veins: peduncles subterminal, becoming 1 or 2 dm. long, villous and sparingly hispidulous: heads at first globular, becoming short-oblong, in fruit 2 or 3 cm. long: calyx narrowly campanulate, white-

villous below, appressed-hispid above; the hispidulous filiform teeth twisted and hooked at the tips, becoming 4 mm. in length: corolla white, early deciduous; the tube 13 to 15 mm. long, spreading above to a limb 2½ cm. broad, with shallow rounded lobes: stamens unequally inserted above the base of the minutely pubescent corolla-tube; anthers pubescent: stigmas filiform: fruiting calyx enclosing the ovate-oblong muriculate and minutely puberulent drupe. — Occurring rarely in the thickets upon hillsides, November, 1894 (no. 70).

Solanum lignescens. Erect, lignescent, 4 or 5 dm. high, sparingly branched, the older parts covered with a thin brownish cortex; branches, leaves, pedicels, and calyces viscid and covered with slightly fuscous stellate hairs: leaves mostly solitary, rarely geminate, ovate-oblong, entire, on thickish petioles 7 to 13 mm. long, acute at base, blunt or rounded at the apex, dull green and sparingly pubescent above, pale and densely pubescent beneath, especially on the midrib and the 7 to 11 lateral veins: umbels 3–6-flowered, subsessile a little below the leaves; the peduncles in fruit becoming 3 or 4 mm. long; pedicels reflexed, in anthesis 7 to 10 mm. long, in fruit becoming twice that length: calyx short-campanulate, 3 mm. long, with 5 oblong obtuse lobes: corolla white, minutely pubescent, 1½ cm. broad, with lance-ovate acute lobes: stamens oblong, about 4 mm. long: style slightly exserted: berries smooth, black, 12 mm. in diameter. — In fields, high up on the mountains, November, 1894 (no. 216). The fresh plant, according to Dr. Palmer, has the odor of tobacco.

Herpestis decumbens. Rather stout, 3 dm. or so high from a decumbent base; the hollow quadrangular stem much branched and delicately spotted with pale green and brown: leaves 4 or 5 cm. long, lanceolate, acuminate, with thickish margins, appressed-serrate above, cuneate below to half-clasping slightly decurrent bases, glabrous, irregularly pitted beneath: flowers solitary in the axils of the short upper leaves; pedicels about 2 mm. in length: calyx subtended by a pair of lanceolate bracts 4 mm. long; the three outer sepals ovate with rounded or subcordate bases, 7 to 9 mm. long, strongly nerved, the posterior larger than the others; inner sepals lanceolate, acuminate, glandular-ciliate on the margins and midrib, about 7 mm. in length: corolla bilabiate, scarcely exceeding the calyx, the upper lip 2-lobed; the tube sparingly pubescent below the four short stamens: ovary and capsule ovate-oblong, covered with pellucid dots; style thickish, dilated, 2-lobed at the apex: capsule 5 or 6 mm. high; seed minute, black, oblong, truncated, and strongly reticulated. — In wet bottoms, March, 1895 (no. 609). A rather stout

plant resembling *H. sessiliflora*, Benth., but well distinguished by its coarser habit, larger leaves and pedicelled flowers, narrower capsule, thicker style, and larger seed.

Dyschoriste saltuensis. A slender suffrutescent plant: stems branching, subtetragonal, densely covered with short appressed hairs, ciliate at the nodes: leaves lanceolate, obtuse at the tips, tapering below into short petioles, the lower cauline 6 cm. long, 1½ cm. wide, the upper scarcely half as large, above covered with obscure linear markings, beneath strigillose-pubescent on the midrib: flowers axillary, solitary, or in glomerules of 2 to 5: peduncles 3 or 4 mm. long: bracts minute: calyx hirsute, 8 or 10 mm. long, divided half way to the base into 5 lance-subulate lobes: corolla light purple, pubescent without, 1½ cm. or less in length, the slender tube equalling the calyx and then spreading into a campanulate throat; lobes oblong, truncate, 4 mm. long: stamens didymous, hirsute; anther-bases mucronate: style hirsute: mature fruit not seen, but the young capsule oblanceolate, glabrous, hardly equalling the calyx. — Common among oaks in the higher mountains, January, 1895 (no. 506).

Ruellia albiflora. A small shrub: the pale brown bark covered with prominent ovate lenticels; upper branches, with the leaves and calyces, covered with pellucid or black granules: leaves mostly on the upper branches, oblong-lanceolate or narrowly ovate, tapering about equally to the bluntish tips and the short petioles (4 to 7 mm.); leaves of the primary branches 4 to 10 cm. long, 1½ to 4½ cm. wide, slightly appressed-pubescent on the midribs beneath, and with a few linear markings upon the epidermis above; those of the branchlets crowded and smaller, becoming even 1 cm. in length: flowers subsessile in the axils of the upper leaves, subtended by linear-spatulate bracts about equalling the calyx: calyx minutely puberulent, the tube 4 mm. long, the 5 lance-subulate lobes 6 or 8 mm. long: corolla white, puberulent without; the tube slender, 2 cm. long, spreading into a narrowly obconic throat 1 cm. high; limb with ovate lobes 8 mm. long: filaments sparingly pubescent; anthers linear, 2 mm. long: style hirsute; stigma 1 mm. long: pod narrowly obovate, 12 mm. long, 4 mm. wide, somewhat dorsally compressed, blunt above, subcuneate below, minutely white-puberulous; seeds 2 to 4, suborbicular, 3½ mm. long, appressed-pubescent, tipped by a minute white caudate appendage. — Collected at Acapulco, November, 1894 (no. 49); and formerly at Armeria (Palmer, 1891, no. 1274). This shrub is very showy in flower, and at Acapulco it grows abundantly in river bottoms and low rich spots among the mountains, where it is called Tronador.

DENTELLA REPENS, Forst. Char. Gen. 26, t. 13. A well known species of Southern Asia and Australia. Growing about Acapulco in ravines or in moist shaded walls of houses, November, 1894 (no. 65).

Genipa (?) cinerea. A loosely branching shrub, with the cinereous bark minutely pubescent: leaves clustered at the ends of the subhorizontal branches: spines 1 or 2 (or 0) toward the tips of the branches, thickish at base, 6 to 9 mm. long: stipules broadly ovate, obtuse, 7 mm. long, puberulent without, pilose within, somewhat persistent: leaves coriaceous on dilated petioles $2\frac{1}{2}$ to 4 cm. long, ovate or obovate, obtusish at the tip, acute or obtuse at the base, 5 to 15 cm. long, 4 to 9 cm. broad, short-pubescent and dull above, cinereous beneath with somewhat woolly hairs; veins prominent beneath: fruit apparently 1-celled, obovate, 7 cm. long (including the short oblong beak), 5 cm. broad; the firm rind 4 mm. thick, with 6 or 8 prominent longitudinal ribs, and many irregular secondary ones, somewhat warty, the outer surface soft-pubescent with short cinereous hairs, the inner surface straw-colored and shining: seeds very many, brown and shining, oblong or suborbicular, about 1 cm. long, thin and slightly concave on one side; the thin testa tending to separate on the edges from the horny albumen; embryo plane, the terete radicle nearly 2 mm. long, the reniform cotyledons about as broad. — Growing among other plants for support in the high mountains near Acapulco, January, 1895 (no. 348). Doubtfully referred to this genus. The apparently 1-celled fruit seems to place it with *Genipa*, but the spinose branches and horny albumen are more characteristic of *Randia*. The seeds are apparently good, and flowering plants may possibly be secured for further study.

Montanoa Palmeri. Large upright shrub with habit of the *Elder*, 2 to $2\frac{1}{2}$ m. high: branches terete, fuscous, striate, marked with lenticels, glabrous: branchlets tomentulose: leaves ample, opposite, slender-petioled, rhombic, crenate, 10 or 12 cm. long, 7 or 8 cm. broad, caudate-acuminate, with a single strong angle or short lobe on each side, 5(–7)-nerved from very near the base, roughish above, slightly paler and tomentulose beneath; the uppermost leaves ovate, crenate but not lobed: corymb ample: bracts linear: heads 1 cm. in diameter: scales of involucre lance-oblong, acute, silky-villous, 6 mm. long: disk-flowers 10 to 12, with tube shorter than the throat; ray-flowers 5; rays white, 6 or 7 mm. long, two thirds as broad: chaff very woolly and with slightly pungent at length recurved tips. — Collected on hillsides near Acapulco, November, 1894 (no. 44). The white flowers have a strong fragrance suggesting apple blossoms.

Encelia tenuis. A very slender plant with puberulent and sparingly hispidulous stems, nearly naked above and producing few-headed panicles: leaves mostly opposite, deltoid-ovate, subcordate, 4 to 7 cm. long, coarsely and irregularly dentate, scabrous on both surfaces, on short slender petioles, subtended by connate suborbicular foliaceous appendages: involucre oblong-cylindrical, 9 mm. high, with 2 or 3 series of puberulent and ciliate lance-acuminate bracts, the outer series much shorter than the inner: rays 8 or 10, sulphur-yellow, 5 mm. long: bracts of the receptacle silky-villous, especially along the backs and toward the acuminate tips: akenes obcordate-ovate, 5 mm. long, appressed-silky, awnless. — Rather scarce on the edge of a cornfield, Acapulco, November, 1894 (no. 96).

Bidens refracta, Brandegee, Zoe, i. 310. Two plants found in a shady river bottom, November, 1894 (no. 205).

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By B. L. Robinson.

Presented March 9, 1898.

I. — REVISION OF THE NORTH AMERICAN AND MEXICAN SPECIES OF MIMOSA.

The greater part of our North American species of Mimosa barely attain our southwestern borders. They are the northernmost representatives in the New World of a large and difficult chiefly tropical group, and their affinities must accordingly be sought among more southern forms. In revising for the *Synoptical Flora* the North American species of the genus, the writer has, therefore, been constantly compelled to trace their southward extension and study their relationships among the Mexican and even Central American species. This has necessitated the examination of critical and imperfectly identified material to such an extent, that a general revision of the Mexican and Central American, as well as the North American species, has seemed the simplest solution of the difficulties. Bentham's well-known monograph * of the genus, — which must always stand as one of the classics of botanical taxonomy, — is as clear and excellent as ever, but has become somewhat antiquated by nearly a quarter of a century of unprecedented activity in exploration. The large and rich collections of Messrs. Pringle, Palmer, J. Donnell Smith, Nelson, Rose, Brandegee, Millspaugh, L. C. Smith, C. L. Smith, Pittier, Conzatti, Dugès, Hartman, and Lloyd, are all of later date. They have added a wealth of new material, but it has been identified at different times and places and, as is natural, with varying degrees of accuracy ; so that in this, as in every other large group, the true results of modern exploration can only be brought to light by revision and monographic study. The specimens cited in the following synopsis are chiefly those of recent collectors, and

* Trans. Linn. Soc. xxx. 388–441.

little effort has been made to repeat the older citations of specimens and localities, which are duly recorded in Hemsley's Biol. Cent. Am. Bot.

Wherever possible, Bentham's paper, the result of more than thirty years' study of the genus, has been taken as a basis of arrangement. But his series of *Rubicaules* seems an unfortunate and artificial aggregation of species without close affinities. Several of these are here placed with the *Schrankioideæ*, and *M. Berlandieri* is referred to what is believed to be its natural position as a variety of *M. asperata*. It is doubtful whether Bentham ever saw *M. Ervendbergii*. At all events he did not recognize what is now evident, namely, that it was founded upon two distinct plants.

The construction of a satisfactory key to the species of *Mimosa* is well nigh impossible. Except in the number of their stamens the flowers are too uniform to furnish many good characters. The inflorescence passes gradually from capitate to spicate, the number of leaflets varies astonishingly upon the same individual, and the spines are singularly inconstant, being well developed or obsolete in plants which appear in all other respects identical. Therefore the key here offered, although the result of considerable study and experimentation, must be used with due caution. *M. albida*, *acanthocarpa*, and *biuncifera* appear to be the types of polymorphous aggregates of intergrading forms. Aside, however, from these species and several of their close allies, the species within the limits of the present paper are pretty clearly marked and show little tendency to intergrade.

Besides the material in the Gray Herbarium, the writer has been kindly permitted to examine and borrow from the material of *Mimosa* in the Herbarium of the N. Y. Botanical Garden. Mr. John Donnell Smith has lent his rich representation of the Central American *Sensitivæ*, and Dr. J. N. Rose of the U. S. National Museum, has sent for examination a large number of most interesting forms from Mexico, collected chiefly by himself and Mr. Nelson, and containing several new and well marked species. Further material has also been sent to the writer from Lower California by Mr. and Mrs. T. S. Brandegee, from Honduras by Dr. Gustavo Niederlein and from New Mexico by Miss Mulford. Upon request several specimens have been examined and compared by the staff of the Royal Gardens at Kew. For all of these favors, which have contributed much to the completeness of the present revision, the writer here expresses grateful appreciation.

The generic limits ascribed to *Mimosa* in this paper fully coincide with those of Bentham and other recent writers, so that it is needless

to repeat here the well-known generic characters. A word may be said regarding the derivation of the name. At least it may be stated that no satisfactory etymology has thus far been suggested. The traditional derivation from *mimus*, a mimic actor, which has for many years been handed down in our text-books, was early given by Tournefort. The name, however, dates back of Tournefort, and his explanation is in several regards unsatisfactory. In the first place no ordinary rules of word-composition would lead to the formation of a Latin substantive ending in *osa* from another ending in *us*. Nor if such derivation could be accomplished does it explain the traditionally long *o* of the penultimate syllable. Prof. J. B. Greenough has suggested a possible connection with a theoretical (although never actually used) active participle *μιμοῦσα* from *μιμέομαι*. Further light upon this subject is desired, but the writer has not had an opportunity to follow the matter historically beyond a few of the more accessible works. Any derivation from *μιμώ*, an ape, seems also to offer philological difficulties.

No authentic specimen of the doubtful M. ARCUATA, Mart. & Gal., has been seen, but from the original description, Bull. Acad. Brux. x. pt. 2, 308, it would seem near to, if not synonymous with, *M. biuncifera*, Benth.

M. GEMINATA, DC. (Prodr. ii. 427; A. DC. Calques des Dess. t. 205), is wholly dubious.

Subg. 1. ASTATANDRA, n. subg. Flowers polygamous in the same head; staminate flowers with twice as many stamens as segments of the corolla; perfect flowers with stamens of the same number as the segments of the corolla.

1. M. tequilana, WATS. Low branching tawny-hirsute annual, armed with weak scattered spines: pinnæ 1 pair; leaflets one or two pairs upon each secondary rhachis,* obovate, rounded and mucronate at the apex, thin, sensitive, glabrous above, appressed-villous with tawny hairs beneath: flowers in small ovoid heads: corolla 3–4-toothed: calyx obsolete: legume armed on edges and valves with weak straight spreading spinescent bristles. — Proc. Am. Acad. xxii. 409 (1887). — Hillsides, Tequila, Jalisco, *Palmer*, no. 378, August to September, 1886, and in the same locality, *Pringle*, no. 4596. Placed in the *Modestæ* by Dr. Watson, who seems not to have noted the two kinds of flowers with differing androeciums.

* When the number of leaflets is given in this paper, it applies merely to those upon a single secondary rhachis, not to those of a whole leaf.

Subg. 2. EUMIMOSA, DC. (as modified by Benth.). Flowers perfect or polygamous: stamens in all equal in number to the lobes of the corolla. — Mém. Lég. xii. 418, & Prodr. ii. 425, in major part; Benth. Trans. Linn. Soc. xxx. 388, 389.

* Pinnæ 1 pair; leaflets very large, ovate or ovate-lanceolate to obovate, 1 or more commonly 2 pairs upon each secondary rhachis, but the inner leaflet of the lower pair mostly much reduced or even wanting. — Series *Sensitivæ*, Benth. l. c. 388, 390.

+ Stem glabrous or in *M. manzanilloana* slightly strigose.

++ Unarmed shrubs or trees.

2. **M. sesquijugata**, J. D. SMITH. Low shrub branched from the base: leaflets elliptic-oblong or lance-oblong, rounded or acutish at the apex, coriaceous and reticulate-veiny, glabrous and lucid above, appressed-setose but soon glabrate and glaucous beneath, 15 to 20 mm. long: petioles slender, essentially glabrous: peduncles downwardly strigose: flowers purplish, tetramerous. — Bot. Gaz. xiii. 74 (1888). — In rock-fissures near Santa Rosa, Dept. Baja Verapaz, Guatemala, altitude 1525 m., July, 1887, *von Tuerckheim* (no. 1327 of J. D. Smith's valuable Guatemalan set).

3. **M. Goldmanii.** Small tree, 3 to 6 m. high: glabrous throughout except for the setose-ciliate margins of the leaflets, stipules, and bracts: stems woody, covered with grayish brown bark: petioles filiform; leaflets obovate-oblong, obtuse or rounded, mucronate, rather thin, green above, perfectly glabrous and slightly glaucescent beneath. 12 to 18 mm. long, 6 to 8 mm. broad; margin ciliate with conspicuous appressed or incurved stramineous bristles; rhachises devoid of bristles; stipules subulate, attenuate, slightly ciliate: peduncles filiform, usually equalling or often exceeding the petioles, fascicled on short or undeveloped secondary axes; heads numerous, globose, 12 mm. in diameter; flowers 4-merous, purplish white: legume unknown. — Collected by *Nelson & Goldman* between Juchitan and Chivela, Oaxaca, at 50 to 275 m. altitude, 1895, no. 2628 (herb. Gray and herb. U. S. Nat. Mus.). This species differs from any of the other Mexican and Central American species of the *Sensitivæ* in its perfectly glabrous peduncles and petioles, also by having the lower surface of the leaflets devoid of setæ as well as any trace of pubescence. It is evidently near the South American *M. glaucescens*, Benth. and *M. angusta*, Benth., but these from description have larger leaflets and are woody only at the base.

++ ++ Shrub, moderately armed with small scattered light-colored recurved spines: margin of legume bearing very short incurved bristles; valves strigillose and also finely pubescent.

4. M. manzanilloana, Rose. Branches sometimes slightly strigose, mostly glabrous, terete, slender, at length verrucose: leaflets oblong, acutish or obtusish and mucronate, glabrous above, setose on the edge and lower surface; petioles slender, glabrous, slightly armed: peduncles slender, 2.5 cm. or more in length: buds considerably exceeding the very small and inconspicuous bracts. — Contrib. U. S. Nat. Herb. i. 326. — Manzanillo, Mexico, December, 1890, *Palmer*, no. 905. Near the common *M. floribunda*, Willd., but essentially glabrous and of much more slender habit.

++ ++ ++ Scandent shrub copiously armed with recurved more or less 4-seriate spines: margin of legume covered with long straight acicular bristles; valves glabrous.

5. M. Velloziana, Mart. Glabrous except for the strigose bristles of the stipules and leaflets: petioles stout, copiously armed with retrorse spines: peduncles short, 12 to 16 mm. in length: bracts in the young heads conspicuous, setose-ciliate, equalling or exceeding the buds. — Herb. Fl. Bras. 185, & Flora, xxii. pt. 1, Beibl. 9; Benth. Trans. Linn. Soc. xxx. 390. *M. viva*, Vell. Fl. Flum. Ic. xi. t. 33 (where leaflets are figured with too fine and copious pubescence), not L. — Isthmus of Panama, *Seemann*, no. 100 (in herb. Gray), and at Chagres, 19 February, 1850, *Fendler*, no. 91. Also, acc. to Hemsley, in pastures at Chojojo, near Mazatenango, Guatemala, *Bernoulli*, no. 60, and at Guanacaste, Costa Rica, *Oersted*. (Also S. Am.) No. 4133 of Captain J. D. Smith's distribution, collected at Malpais, Dept. Santa Rosa, Guatemala, and determined as this species by Micheli, differs in its less armed stems and petioles, longer peduncles, and inconspicuous floral bracts. It is undoubtedly distinct from *M. Velloziana*, but the specimen lacks fruit.

+ + Stem at least toward the apex covered with soft usually spreading as well as bristly pubescence or rarely in *M. floribunda* merely strigillose.

++ Slender, herbaceous or suffrutescent: leaflets obovate to oblong, rounded and mucronulate at the apex, appressed-villous or setulose upon both surfaces: legume copiously setose on valves and margin.

6. M. debilis, H. & B. Scarcely armed: pubescence fine, spreading: petioles long and slender, unarmed: pods copiously setose on margins and valves. — H. & B. in Willd. Spec. iv. 1029; Benth. l. c. 391. *M. notata*, Steud. Flora, 1843, 758, & *M. Hostmanni*, Benth. in Hook. Lond. Jour. Bot. v. 84, acc. to Benth. — Trop. S. Am.

Var.? **panamensis**, BENTH. Annual or a slender undershrub, armed with scattered recurved spines: leaflets oblong, narrower than in the typical form, the larger 18 mm. long, 6 mm. broad. — Trans. Linn. Soc. xxx. 391. — Panama, in meadows near Nata, *Seemann*, no. 98 (in herb. Gray); also at Boruca, Costa Rica, *Pittier*, no. 4554 (distrib. as *M. sensitiva*).

++ ++ Armed shrubs with ovate-lanceolate or ovate-oblong, acutely or at least bluntly pointed leaflets: margin of legume bearing long straight spreading spinescent bristles; valves sparingly covered with weak straight appressed bristles.

M. SENSITIVA, L. Spines of stem numerous (rarely few), somewhat 4-seriate, very short, recurved: petioles copiously armed; leaflets lanceolate, thickish, glabrous or puberulent above, appressed-setulose beneath. — Spec. i. 518 (Breyne, Cent. 31, t. 16); Benth. Trans. Linn. Soc. xxx. 390, & in Mart. Fl. Bras. xv. pt. 2, 305. — Brazil, *Claussen* (Mart. Herb. Fl. Bras.) 1079 (in herb. Gray). This S. American species has been credited to Costa Rica by Micheli (Bull. Soc. Bot. Belg. xxx. 294) on the basis of Pittier's nos. 23, 1279, 1279 bis, 1447, 1448, 3013, but the writer, who (through the kindness of Captain J. Donnell Smith) has seen specimens of all these numbers except 1448, would regard them as mere forms of *M. albida*, H. & B.

++ ++ ++ Armed shrubs with leaflets mostly acutish but sometimes rounded at the apex: legumes finely strigillose with short appressed or often incurved hairs both on margin and valves.

7. M. albida, H. & B. A polymorphous species: stems armed with scattered (not seriate) spines, and covered with spreading usually copious often tawny hairs: leaflets acutish rarely obtuse or rounded, covered on both surfaces with fine white appressed hairs which are denser and often mixed with strigose bristles beneath: pedunculate heads axillary or aggregated in long terminal almost naked racemes. — H. & B. in Willd. Spec. iv. 1030; Kunth, Mimos. 2, t. 1. *M. sensitiva*, Lodd. Bot. Cab. t. 249; Micheli, Bull. Soc. Bot. Belg. xxx. 294; not L. — S. Mexico and Centr. Am., southward to Peru. San Luis Potosi, *Pringle*, no. 3970; Sinaloa, *Rose*, no. 1731 (peculiar form with broad very obtuse leaflets); Jalisco, *Palmer*, no. 693 (coll. of 1886); Orizaba, *F. Müller*, no. 172, *Bourgeau*, no. 2861; Oaxaca, *Nelson*, nos. 792, 2070, *L. C. Smith*, no. 792; Vera Cruz, *Nelson*, nos. 63, 479; Huasteca, *Ervendberg*, no. 1; Guatemala, *Hayes*, *J. D. Smith*, nos. 300, 2307, 6118 (in part passing to var. *floribunda*); Costa Rica, *Oersted* no. 10, *J. D. Smith*, nos. 5765, 8975, *Pittier*, nos. 23, 1279, 1279 b, 1447, 3013,

Tonduz, no. 1568; Honduras, *J. D. Smith*, no. 5215, *Niederlein*. In a considerable series of specimens it has been impossible to find any constant or satisfactory characters or combinations of characters to separate this species from the following forms here included as varieties. The differences of pubescence, which are striking in extremes, undergo the most gradual and complete intergradation and appear to be correlated with no other important distinctions. It is probable that all the forms here given cross freely when occurring in the same region.

Var. strigosa (*M. strigosa*, Willd. l. c.). Leaflets acutish, beset upon both surfaces with coarser strigose hairs. — Costa Rica, *Oersted*, no. 8.

Var. floribunda (*M. floribunda*, Willd. l. c. 1031). Leaflets acutish, glabrous above, covered below with appressed setæ: pedunculate heads mostly collected in almost naked terminal racemes: corolla puberulent to tomentulose. — Jalisco, *Palmer*, no. 705 (coll. of 1886); Orizaba, *Botteri*, no. 569, *Seaton*, no. 141; Vera Cruz, *Bourgeau*, no. 1541, *C. L. Smith*, nos. 1142, 1716, 1719, *Nelson*, nos. 72, 160; Puebla, *Nelson*; Guatemala, *Hayes*, *J. D. Smith*, no. 3308. Captain Smith's no. 5764 from Costa Rica, and Kerber's nos. 119 and 353 from S. Mexico are good examples of transitions between *M. albida* and its var. *floribunda*. It is probable also that leaflets which are at first pubescent above are sometimes glabrate in age.

Var. euryphylla. Scarcely armed: leaflets broad, obovate, rounded and merely mucronulate at the apex, glabrous and somewhat lucid above, appressed-villous beneath: corolla glabrous. — Collected by *E. W. Nelson* in the valley of Jiquipilas, Chiapas, altitude 675 to 850 m., 16 to 18 August, 1895, no. 2927 (in herb. U. S. Nat. Mus.).

Var. glabrior. Stem and branches nearly glabrous: leaflets acute or acutish, glabrous above, sparingly setose beneath: corolla glabrous. — *M. Velloziana*, Micheli in J. D. Smith, Pl. Guatem. &c. iv. 49, not Mart. — Coll. *Heyde* & *Lux* at Malpais, Dept. Santa Rosa, Guatemala, altitude 1230 m., no. 4133 of J. D. Smith's distrib.

* * Pinnæ 1 to several pairs; leaflets 3 to several pairs, smaller.

+ Stems herbaceous (sometimes becoming slightly ligneous in *M. pudica*), hirsute with spreading often tawny hairs; pinnæ 1 or 2 (closely approximated) pairs.

++ Leaflets ovate or obovate: fruit finely pubescent upon the valves.

8. M. Skinneri, Benth. Low, much branched hirsute annual: leaves with 2 or 4 digitately arranged secondary rhachises; leaflets obovate, 3 to 8 pairs, crowded, obtuse, very sensitive, glabrous above, appressed tawny-villous below: infra-stipular spines stramineous, straight:

legume about 3-jointed, finely pubescent upon the valves and strongly setose on the margin. — Benth. in Hook. Lond. Jour. Bot. v. 85, & Trans. Linn. Soc. xxx. 392. — Borders of Oaxaca and Chiapas, *Nelson*, no. 2858; Guatemala, *Skinner*, acc. to Benth., *J. D. Smith*, nos. 3758, 6132; Costa Rica, Ujaras, *Oersted*, acc. to Hemsl.

9. **M. Pittieri**, Micheli. Pinnæ always 2 pairs; leaflets 5 to 6 pairs, ovate, ciliate: infra-stipular spines recurved, caducous: peduncles axillary, solitary, exceeding the petioles: bracts nearly or quite as long as the corolla. — Bull. Soc. Bot. Belg. xxx. 294 (whence description is compiled). — Near Rio Jesus Maria Puntarenas, Costa Rica, *Pittier*, no. 502. Not seen by the writer.

++ Leaflets oblong.

= Margin of legume bearing very short recurved hairs; valves pubescent and often strigillose.

10. **M. affinis**, Robinson. Pinnæ 1 pair; leaflets 8 to 12 pairs, acutish: peduncles shorter than the petioles. — Bot. Gaz. xvi. 341. — Grassy land near Mazatlan, *W. G. Wright*, nos. 1218, 1265; hillsides near Tequila, *Pringle*, no. 5453; Colima, *Palmer*, no. 131 (coll. of 1897); wet soil near Cuernavaca, Morelos, *Pringle*, no. 6662.

== Valves of the legume glabrous; margins setose with straight spreading bristles: pinnæ 1 or more commonly 2 approximate pairs.

11. **M. pudica**, L. The well known sensitive plant of cultivation, very variable as to pubescence: occasional scattered spines as well as the infra-stipular usually present. — Spec. i. 518; Benth. Trans. Linn. Soc. xxx. 397, where extensive synonymy is given. — Common throughout tropical America from S. Mexico southward; Orizaba, *Bourgeau*, no. 2400; Vera Cruz, *Bourgeau*, no. 1759, *C. L. Smith*, no. 999, *Nelson*, nos. 159, 393; Costa Rica, *J. D. Smith*, no. 5767; Honduras, *J. D. Smith*, no. 5219, *Niederlein*; Panama, *Fendler*, no. 96, *Seemann*, no. 102. (Also extensively naturalized in the warmer countries of the Old World and said to be spontaneous in some parts of our Southern States.)

+ + Stems decidedly ligneous.

++ Spines infra-stipular or scattered: pinnæ 1 or 2 pairs: fruit (where known) rather narrow, not exceeding 8 mm. in breadth.

= Leaflets 13 to 25 mm. long.

a. Branchlets and peduncles scabrous-pubescent.

12. **M. tricephala**, Cham. & Schlecht. Spines straight: leaflets 10 to 15 pairs, ovate-oblong, 1–2-nerved, glabrous above, strigose beneath, 1.2 cm. long. — Linnæa, v. 591; Benth. Trans. Linn. Soc.

xxx. 394 (whence foregoing description). — Mexico near Actopan, *Schiede*, acc. to Benth. (Trop. Am.).

b. Branchlets and peduncles smooth or merely puberulent.

1. Leaflets ovate or broadly oblong.

13. M. lactiflua, Delile. Shrub: spines few, scattered, straight: leaflets 3 to 5 pairs, obliquely ovate or oblong, somewhat rigid, glaucescent beneath, pinnately veined, glabrous on both surfaces; margins slightly cartilaginous, incurved, ciliate with rigidulous stramineous setæ: flower 4-merous: legume unknown. — Delile acc. to Benth. Trans. Linn. Soc. xxx. 393, & in Mart. Fl. Bras. xv. pt. 2, 311. — Regarding the Mexican occurrence of this species Bentham (from whom the preceding description is compiled) says, "Delile's specimens were from the Botanical Garden of Montpellier, supposed to be of American, perhaps Brazilian origin. In the Berlin Herbarium there is a specimen from Mexico which agrees with the detailed description I had made (now inserted in the Flora Brasiliensis) except that the leaflets are under instead of over $\frac{1}{2}$ in. long." While this species is known to me only from description I would refer to it Mr. Nelson's no. 1845, collected 9 km. above Dominguillo, Oaxaca, altitude 1375 to 1700 m.

2. Leaflets rather narrowly oblong.

14. M. sicyocarpa. Shrub, 1 to 2 m. high, sparingly armed with short scattered recurved spines: branches terete: petioles slender, glandless, 5 or 6 cm. in length, usually armed below the middle with a single short recurved spine: pinnæ a single pair, 1 dm. in length; leaflets 9 to 11 pairs, oblong, oblique at the base, subacute, mucronate, dull green and finely soft-pubescent upon both sides, slightly paler beneath, 20 to 25 mm. in length, a third as broad: peduncles axillary, often geminate, finely pubescent, unarmed: flowers 4-merous: legumes lance-oblong, 25 to 30 mm. long, 8 mm. broad, covered upon margin and valves with weak straight spreading stramineous setiform spines. — Collected by *E. W. Nelson* on roadside between San Sebastiana and the summit of the mountain known as the Bufo de Mascota, Jalisco, altitude 1550 m., 20 March, 1897, no. 4101. The bristling pods crowded in dense globular heads recall the fruit of the star-cucumber.

15. M. cærulea, Rose. Stems unarmed, nearly or quite glabrous, 6 to 9 dm. high, straight and terete: leaflets narrowly oblong, 12 mm. in length, acutish, mucronate, green on both sides, appressed setose-ciliolate, minutely appressed-puberulent or sparingly strigose varying to glabrous, reticulate-veiny: peduncles fascicled: flowers purplish,

4-merous, staminate and perfect: legume with glabrous valves; margin armed with very short incurved prickles. — Contrib. U. S. Nat. Herb. v. 141. — On foot hills and in mountain woods above Cuernavaca, *Pringle*, nos. 6200, 6385 (distrib. by clerical error as *cærulescens*); and between Guichocovi and Lagunas, Oaxaca, *Nelson*, no. 2746. A beautiful and very distinct species.

= = Leaflets 8 to 10 mm. long.

a. Branchlets and peduncles strigillose or covered with a sparing sub-appressed scabrous pubescence.

16. M. Nelsonii. Scabrous-puberulent shrub, 3 to 6 dm. high: branches woody, covered with a dull gray bark; branchlets warty-roughened: petioles short, scabrous-puberulent; pinnæ 1 pair; leaflets 5 to 11 pairs, broadly oblong, rounded at both ends, appressed-ciliate, of firm subcoriaceous texture, slightly lucid, 7 to 9 mm. long, 4 mm. broad, when young finely pubescent upon both sides but sometimes early glabrate, or perhaps glabrous at first, often (especially the lowest one) strigillose beneath: peduncles considerably exceeding the petioles, somewhat pubescent and strigillose: globose heads 10 mm. in diameter; bracts shorter than the buds, inconspicuous; flowers 4-merous, perfect and staminate: fruit light-colored, oblong, 2 cm. in length, 6 mm. in breadth, 3–4-jointed, hispid throughout with spreading curved bristles. — Collected in fruit by *Dr. Edward Palmer* near Acapulco, between October, 1894, and March, 1895, no. 88, and in flower by *E. W. Nelson*, between San Geronimo and La Venta at 665 m. altitude, 13 July, 1895, no. 2775 (in herb. U. S. Nat. Mus.). A species nearly related to the Lower Californian *M. Xanti*, but differing in its more sparing and scabrous pubescence, and much shorter bracts. Palmer's specimen is armed with straight scattered spines, while Nelson's is unarmed, yet their identity cannot be doubted.

b. Pubescence of branchlets and peduncles more copious, tawny-tomentose, spreading, softer in character.

17. M. Xanti, Gray. Leaflets 4 to 9 pairs, oblong, pubescent upon both sides, cinereous beneath, scabrous-ciliolate upon the margin, about 8 mm. long: bracts exceeding the buds and conspicuous in the young heads: legume 2–4-jointed, stipitate, 2 cm. long, covered with fine pubescence and short scattered setæ both upon valves and margins. — Proc. Am. Acad. v. 157; Benth. Trans. Linn. Soc. xxx. 396; Brandegee, Proc. Calif. Acad. Sci. ser. 2, iii. 133. — Lower Calif. near Cape St. Lucas, *Xantus*, no. 29; *Brandegee*, no. 183.

++ ++ Spines numerous, small, recurved, somewhat 4-seriate: pinnæ 4 to 5 pairs: fruit 2 cm. broad.

18. M. leptocarpa, Rose. A straggling shrub with long lax glabrous branches: pinnæ 4 to 5 pairs, often alternate; leaflets 8 to 11 pairs, oblong, obtuse, minutely puberulent (under lens): legume 12 or 15 cm. long, 2 cm. broad; replum armed with a few short firm recurved prickles. — Contrib. U. S. Nat. Herb. i. 326. — Manzanillo, *Palmer*, no. 1341 (December, 1890). An anomalous species known only in fruit, so that even its generic affinities are subject to some doubt. Dr. Rose has found the remains of five stamens clinging about the base of the legumes. The fruit is of course extraordinarily large for *Eumimosa*, but seems to possess the distinctive characters of the genus.

Subg. 3. Habbasia, DC. (as extended by Benth.). Stamens twice as many as the lobes of the corolla. — DC. Mém. Lég. xii. 418 & Prodr. ii. 428; Benth. Trans. Linn. Soc. xxx. 389, 411.

* Flowers in cylindrical lax or dense elongated or rarely (in *M. adenantheroides*) subcapitate spikes. — *Leptostachyæ*, Benth. l. c. 389, 412.

+ Leaflets 1 to 5 rarely 7 pairs, elliptical, ovate, or obovate, not twice as long as broad.

++ Leaflets and younger parts tomentose or tomentulose.

= Leaflets 15 mm. or more in length.

19. M. spirocarpa, Rose. Showy tomentose shrub, sparingly armed with scattered spines: pinnæ 2 to 4 pairs; leaflets 1 to (less frequently) 3 pairs, broadly obovate: short-peduncled spikes numerous, rather slender, 7.5 cm. in length, purplish turning white: corolla 5-lobed: pods small, light-colored, tomentulose, soon coiled through 1 to 1½ revolutions. — Contrib. U. S. Nat. Herb. iii. 316, t. 11. — Sinaloa, Culiacan, *Palmer*, no. 1476, H., and later between Rosario and Colomas, *Rose*, no. 1606. Notwithstanding the exceptional form of the fruit there can be no doubt that Dr. Rose has correctly determined the affinities of the species.

20. M. guatemalensis, Benth. Fulvous-tomentose shrub armed with a few scattered straight spines: pinnæ 3 to 6 pairs; leaflets 3 to 6 pairs, elliptical: spikes 5 cm. long on peduncles half as long; flowers silky-villous: legume still unknown. — Bot. Sulph. 89, & in Hook. Lond. Jour. Bot. v. 89. *Inga? Guatemalensis*, Hook. & Arn. Bot. Beech. 419. — W. Mexico, Cerro de Pinal, *Seemann*, Tepic, *Barclay* (acc. to Hemsl.), *Lamb*, no. 583, near Colomas, *Rose*, no. 3200; Realejo, Nicaragua, *Sinclair*.

= = Leaflets 7 to 10 mm. in length.

21. M. distachya, Cav. Covered throughout with a fine close puberulence or tomentulose pubescence: spines stout, recurved, solitary on the internodes, directly beneath the leaves or removed from them or rarely absent: pinnæ about 3 pairs; leaflets 2 to 5 pairs, obovate, not crowded, finely and closely pubescent upon both surfaces: spikes geminate from the axils, pedunculate, rather short and dense. — Icon. iii. 48, t. 295; Benth. Trans. Linn. Soc. xxx. 417. — Mazatlan, Sinaloa, *Rose*, no. 1393; Cordillera of Oaxaca, *Galeotti*, no. 3240, acc. to Benth. (Also S. Am.). Dr. Rose's specimen shows the hitherto unknown legume to be oblong, 3.6 cm. in length, about 5-seeded, sharply tipped, puberulent and unarmed or armed on the margin with a few scattered short weak prickles.

+ + Leaflets and younger parts of stem glabrous or merely puberulent.

= Valves of fruit hispid with numerous tawny bristles.

22. M. Brandegei. A spreading shrub, 2 to 3 m. high: spines single or double, stout, recurved, borne mostly near the middle of the internode: pinnæ 3 to 4 pairs: leaflets 2 to 4 pairs, obovate, nearly concolorous, glabrous above, puberulent (under lens) beneath, 9 to 15 mm. long, rounded but slightly mucronate at the summit; rhachises sparingly pubescent: spikes single or fascicled by 2's or 3's, peduncles 3 or 4 cm. long: flowers white or nearly so: young fruit narrowly oblong, minutely pubescent and also bristly-setose. — *M. distachya?* Brandegee, Proc. Calif. Acad. Sci. ser. 2, iii. 133, not Cav. — San José del Cabo, Todos Santos, La Paz, Lower Calif., *Brandegee*, no. 184 (herb. Gray, herb. Brandegee).

= = Fruit glabrous, unarmed.

23. M. laxiflora, Benth. Shrub, glabrous or nearly so, with striate branches and stoutish recurved spines: pinnæ 3 or 4 pairs; leaflets 3 to 5 pairs, obovate, glabrous or early glabrate, 7 to 10 mm. long, about 3-nerved: spikes solitary or geminate, lax; flowers essentially glabrous, white: pods oblong, thin, glabrous, stramineous, unarmed, about 8-seeded. — Benth. in Hook. Lond. Jour. Bot. v. 93, & Trans. Linn. Soc. xxx. 418. ? *Acacia prosopoïdes*, DC. Prodr. ii. 460; A. DC. Calques des Dess. t. 210. — Gattunas, Sierra de la Union, near the southern boundary of New Mexico, *Schott;* mountains of N. W. Sonora, *Pringle*, 12 August, 1884; S. W. Chihuahua, *Palmer*, no. 41 (1885); near Guaymas, *Palmer*, no. 169 (coll. of 1887); Sonora Alta, *Th. Coulter*, no. 522, acc. to Hemsl.

Var. zygophylloides. Leaflets reduced to a single terminal pair on each secondary rhachis, 4 to 6 mm. long, slightly rounder, thicker, and more veiny than in typical form. — Collected in flower at Manzanillo, Colima, by *Prof. M. E. Jones*, 25 June, 1892, no. 193 (herb. U. S. Nat. Mus.). The peculiar arrangement of the leaflets here corresponds to that in *M. Rosei*, characterized below, but the leaflets themselves, even at full maturity, are not more than a third as large.

24. M. Rosei. Unarmed, glabrous: branches striate: stipules subulate; petiole and primary rhachis glandless, about 13 cm. long; pinnæ 4 pairs; secondary rhachises stipellate and geniculate near the base, 12 to 14 mm. long; leaflets, mostly a single pair, rhombic-obovate, obtuse, glabrous, deep green above, not lucid, somewhat paler green beneath, 15 to 22 mm. long, two thirds as broad: spikes axillary, solitary, (including short peduncle) 6 cm. long in fruit: legume (scarcely mature) linear-oblong, acuminate, flat, thin with firmer margin, about 8-jointed, 7 cm. long, 5 mm. broad; the segments sharply limited by straight transverse lines. — Collected in young fruit by *Dr. J. N. Rose*, at Balaños, Jalisco, 10 to 19 September, 1897, no. 2919.

= = = Fruit tomentulose but not setiferous.

25. M. purpurascens. Habit, thorns, &c., much as in *M. laxiflora*: pinnæ 4 to 5 pairs; leaflets about 4 pairs, 4 to 6 mm. long, puberulent (under lens) below; rhachises puberulent: spikes solitary or geminate, 4 cm. long including short peduncle; flowers subsessile, distinctly purplish: calyx finely pubescent: pods about 5-seeded, oblong, acute, 3.5 cm. long. — *M. laxiflora*, Brandegee, l. c., at least in part, not Benth. — Lower Calif., at La Paz, *Brandegee*, 4 February, 1890, no. 185, in flower, and at Purisima, 13 February, 1889, in fruit, secured by same collector. Some old fruit collected by *Xantus* in 1873, appears to be of the same species. Type in herb. Brandegee. Although near *M. laxiflora*, this plant cannot be satisfactorily referred to it.

+ + Leaflets 4 to 15 (rarely 20) pairs, linear to elliptic-oblong, mostly more than twice as long as broad: fruit not exceeding 1 cm. in breadth: shrubs, mostly armed.

++ Pods thin, sometimes setose but not tomentose; segments much broader than long.

26. M. polyantha, Benth. Shrub 1 to 2 m. high: spines stout, recurved, solitary beneath the axils: leaves not fully developed at time of flowering: pinnæ 2 to 3 pairs; leaflets 4 to 8 pairs, oblong, small, glabrous above, sparingly appressed-pubescent or glabrous beneath, about 5 mm. long: spikes numerous, 4 or more fascicled at each node of the

flowering branches; flowers glabrous: fruit oblong, 4 cm. long, 8 mm. broad, about 8-seeded, abruptly acuminate at each end, thin, lucid, hispid on margin and valves with short spreading setæ. — Benth. in Hook. Jour. Bot. iv. 410, & Trans. Linn. Soc. xxx. 417. — Acatlan, *Andrieux* (acc. to Benth.); Tomellin Cañon, Oaxaca, altitude 775 m. *Pringle*, no. 4635 (distrib. as *M. disticha*); Acaponeta, Tepic, *Rose*, no. 1475; also in W. Mexico, *Palmer*, 1891–1892, without number. The fruit of this species was unknown to Benth. The still sparing material available has the fruit most often hispid and that form of pod is accordingly assumed to be typical. A doubtful form with glabrous somewhat more numerous and relatively narrower leaflets has been collected without fruit in Oaxaca by *L. C. Smith*, no. 202, and *Nelson*, no. 2629.

Var. levior. Fruit nearly or quite free from hispidity: otherwise indistinguishable from the plant here regarded as typical. — Collected in W. Mexico, 1891–1892, by *Dr. Edward Palmer*, but without number or more precise data. Types in herb. Gray and herb. U. S. Nat. Mus.

++ ++ Pods tomentose, armed or unarmed; segments subequilateral or longer than broad.

= Stems not glandular.

a. Calyx subtruncate, very short, 0.8 mm. long, a quarter the length of the corolla: spikes long.

27. **M. Palmeri**, Rose. Large shrub, unarmed or with occasional infra-stipular spines: pinnæ 9 to 15 pairs; leaflets 7 to 10 pairs, elliptic-oblong, not crowded, glabrous above, puberulent beneath: spikes (including peduncles) 7 to 10 cm. long, numerous in showy terminal leafless panicles; flowers purplish, puberulent: young fruit linear-attenuate, tomentulose. — Contrib. U. S. Nat. Herb. i. 99. — Near Alamos, *Palmer*, no. 628; collected in flower in September. [1890]

28. **M. fasciculata**, Benth. Shrub with stout angulate branches and tawny or rusty-tomentose branchlets: spines short, broad-based, dark red, mostly infra-axillary, commonly grouped by 2's or 3's: leaves when well-developed 2 to 3 dm. in length; pinnæ 11 to 20 pairs; leaflets 8 to 15 pairs, oblong, villous-tomentose upon both sides: spikes crowded in a terminal raceme; flowers silky-villous: pods narrow, attenuate, ferrugineous-tomentose and hispid with numerous reddish brown rigidulous setæ. — Benth. in Hook. Lond. Jour. Bot. v. 88, & Trans. Linn. Soc. xxx. 414; Wats. Proc. Am. Acad. xxii. 409. *M. cinerea*, Herb. Pavon acc. to Benth. l. c. *Acacia fasciculata*, Kunth, Mim. 75, t. 23. — Originally collected near Guanajuato by *Humboldt & Bonpland*; later by *Karwinski* without exact locality; on hillsides near

Guadalajara, Jalisco, *Palmer*, no. 449 (coll. of 1886) in fruit, *Pringle*, nos. 2914, 4459, in flower; near Tamazulapam, Oaxaca, *Nelson*, no. 1962.

Var. malacocarpa. Fruit fulvous-tomentose but nearly or quite devoid of prickles. — Collected by *E. W. Nelson*, between Amolac, Puebla, and Sochi, Guerrero, altitude 1200 to 1260 m., 28 November, 1894, no. 2023, and by *J. N. Rose*, at Bolaños, Jalisco, September, 1897, no. 2917. Indistinguishable from the typical form except by its strikingly different fruit. The original specimens of *Acacia fasciculata* described by Kunth were not in fruit, so it is impossible to say which form was the original one. Under the circumstances it seems best to adopt as the typical form the one of which the fruit was first described (see Wats. l. c.).

b. Calyx more distinctly toothed, 1 to 1.5 mm. long, a third to half the length of the corolla: spikes shorter and thicker.

1. Spines mostly dark-colored, not greatly compressed.

29. M. cœlocarpa. Shrub, armed with small scattered straight spines; bark of branches gray: pinnæ 6 to 8 pairs; leaflets oblong, acutish, green on both sides, appressed-puberulent upon margin and lower surface, 3 mm. long, eccentrically 1-nerved, thin; stipules setaceous: spikes mostly geminate in the upper axils, moderately loose; peduncles slender, 14 to 18 mm. long: buds obovoid: flowers white with roseate tinge: corolla 4-parted: stamens 1 cm. in length: pods oblong-linear, acute at both ends, unarmed, tomentulose, 4 or 5 cm. long, 5 mm. broad; margins thickened; segments distinctly concavo-convex, the seed more or less prominent within the concavity. — Collected at Topolobampo, Sinaloa, Mexico, by *Dr. Edward Palmer*, 15 to 25 September, 1897, no. 187. Near the next, but distinguished by its peculiar fruit, longer peduncles, looser spikes and thinner leaflets. Types in herb. Gray and herb. U. S. Nat. Mus.

30. M. Wrightii, Gray. Shrub, armed with scattered spines: branchlets tomentulose, angulate; leaves much as in the last but thicker, varying from tomentose to subglabrous: peduncles shorter, 1 to 1.5 cm. long: spikes short and at first very dense; buds subglobose, tomentose: pods rusty-tomentose, unarmed; margins thick; segments not distinctly concavo-convex. — Pl. Wright. ii. 52; Benth. Trans. Linn. Soc. xxx. 417. — Mountains of Arizona, *Palmer*, *Pringle*, *Toumey*, nos. 37, 38; Sonora, *Wright*, no. 1041 (type); Chihuahua, *Pringle*, no. 359, *Hartman*, no. 732. A greener and usually less tomentose plant than the next species.

2. Spines light-colored, conspicuously compressed and very broad at the base.

31. **M. dysocarpa**, Benth. Shrub with stems angled: pinnæ 6 to 12 pairs; rhachis elongated, slightly armed with small scattered spines; leaflets 7 to 16 pairs, densely silky-villous almost tomentose, somewhat cinereous, oblong, 4 to 6 (to 8) mm. in length, acutish: spikes at first dense, at length laxer, 2.5 to 7.5 cm. long exclusive of the much shorter peduncle, subpaniculately aggregated at the summit of the stem: calyx and pods tomentose, the former 2 mm. or more in length, turbinate below; the latter 2.5 to 5 cm. long, about 6-seeded, more or less constricted between the seeds, sharply acuminate, unarmed or provided with a few short curved spines on one edge. — Benth. in Gray, Pl. Wright. i. 62, & Trans. Linn. Soc. xxx. 414, t. 66; Gray, Pl. Wright. ii. 51; Coult. Contrib. U. S. Nat. Herb. ii. 97. — Rocky hills, W. Texas, *Wright*, no. 163; New Mexico, *Thurber*, no. 1104, *Wright*, no. 1040; *Miss Mulford*, nos. 387, 696; Arizona, *Rothrock*, no. 511, *Rusby*, no. 113a, *Lemmon*, no. 2690; State of Durango, Mexico, *Palmer*, no. 418 (coll. of 1896).

= = Stem covered with minute sessile or stipitate glands.

32. **M. adenantheroides**, Benth. Stem puberulent, glandular-punctate: spines recurved: pinnæ about 9 pairs; leaflets about 9 pairs, obliquely oval, obtuse, 3-nerved, pubescent, pale beneath: spikes fascicled by 3's; flowers pubescent. — Benth. in Hook. Lond. Jour. Bot. v. 88; & Trans. Linn. Soc. xxx. 416. *Acacia adenantheroides*, Mart. & Gal. Bull. Acad. Brux. x. pt. 2, 310. — On calcareous and gneissic mountains of Sola and Yolotepeque, Cordillera of Oaxaca, at 2153 to 2307 m., *Galeotti*, no. 3208. Description compiled. Near this species must stand two differing yet doubtfully distinct plants collected in the mountains of Oaxaca by *Nelson*, and represented by his nos. 2078 and 1479. Both differ from the above description in having only 3 to 5 pairs of pinnæ, but without fuller knowledge of Bentham's species can neither be identified with it nor positively excluded from it.

+ + + Leaflets 15 to 40 pairs, oblong: fruit not 1 cm. in breadth: unarmed tree.

33. **M. puberula**, Benth. Pinnæ 5 to 10 pairs; leaflets 15 to 40 pairs, crowded, oblong, rigid, obtuse, 4 to 5 mm. long: spikes axillary, 4 to 5 cm. long: fruit stipitate, flat, pubescent. — Benth. in Hook. Lond. Jour. Bot. v. 88, & Trans. Linn. Soc. xxx. 413. — Zimapan, *Th. Coulter*, and "New Spain" Herb. Pavon, acc. to Benth. Description compiled.

+ + + + Leaflets 15 to 40 pairs: fruit over 1.5 cm. broad: armed shrub, not glandular.

34. **M. platycarpa**, Benth. Thorns scattered, recurved: pinnæ 6 to 10 pairs; leaflets 15 to 25 pairs, linear, 2 to 3 mm. long: spikes slender, loosely flowered: fruit stiped, flat, glabrous, nearly 4 cm. in length. — Trans. Linn. Soc. xxx. 417. — Guatemala, *Skinner* (acc. to Benth.). Description compiled.

+ + + + + Leaflets 22 to 40 pairs, linear-oblong: stem arborescent; branches armed, glandular-pubescent.

35. **M. Cabrera**, Karst. Small tree armed with scattered straight spines: pinnæ 5 to 8 pairs; leaflets 18 to 35 pairs, 5 mm. long, concolorous, pubescent upon both sides: flowers somewhat verticillate in long flexuous interrupted spikes: legume flat, pubescent. — Fl. Colomb. ii. 63, t. 132; Benth. Trans. Linn. Soc. xxx. 416. ? *M. tenuiflora*, Poir. Suppl. i. 82, not Benth. ? *Acacia tenuiflora*, Willd. Spec. iv. 1088. — ? San Salvador, *Wendland* (acc. to Benth. & Hemsl.); Valley of Comayagua, Honduras, *Niederlein*. Northern S. America. If Bentham is right in stating that this species is the same as *Acacia tenuiflora*, Willd., there seems no reason why Poiret's *Mimosa tenuiflora* should not be taken up for it upon grounds of priority, but on a comparison of an authentic specimen of *M. Cabrera*, with Willdenow's original description there appear to be several striking differences rendering real identity impossible. *M. Cabrera* is called by the Spanish Americans "carbon" or "carbonal" and its wood is, acc. to Niederlein, used to make charcoal.

* * Flowers in globose, ovoid or (in *M. monancistra*) subcylindric heads.

+ Shrubs or trees with hard wood, rarely (in *M. Lemmoni* and *M. Grahami*) only undershrubs: branchlets mostly armed with scattered or infra-stipular never seriate spines: pubescence never strigose: corolla not striate.

++ Pubescence not rufous: pods setose or spinose upon the valves.

= Pod oblong or moniliform, not over 1 cm. broad.

36. **M. monancistra**, Benth. Low shrub with flexuous grayish often striate branchlets: internodes armed by a single short recurved subaxillary spine (which is frequently some distance beneath the leaf insertion): pinnæ 2 to 3 pairs; leaflets mostly 4 pairs, oblong or elliptical, obtuse, 3 to 6 mm. long, appressed-pubescent: heads ovoid or short-cylindric; flowers silky-tomentulose: pods 3 to 5 cm. long, acuminate, 3–7-jointed hispid with stramineous setæ or weak spines. — Pl. Hartw. 12, & Trans. Linn. Soc. xxx. 425: Wats. Proc. Am. Acad. xvii. 350. — W. Texas, on the Rio Pecos, *Havard*, no. 66; Mexico, Tamaulipas, *Berlan-*

dier, nos. 831, 2251, 3145; Coahuila, *Gregg*, *Palmer*, no. 290 (coll. of 1880), *Pringle*, no. 217; Guanajuato, *Dugès;* Aguas Calientes, *Hartweg*, no. 70 (type); Jalisco, *Rose*, nos. 3572, 3665; Michoacan, *Pringle*, no. 3733; Oaxaca, *L. C. Smith*, no. 18.

37. **M. Emoryana**, Benth. Branchlets tomentulose; spines single but borne usually at the side of (not often beneath) the axils: leaves small, appressed-tomentulose and cinereous; rhachis scarcely over 6 mm. in length; pinnæ about 2 pairs, crowded, 8 mm. long; heads globose: young fruit as in the last. — Trans. Linn. Soc. xxx. 426. — Gravelly hills near the Cibolo of the Rio Grande, *Bigelow*, 28 July, 1852, no. 312, which was the type number, although it was cited in the original description by clerical or typographical error as no. 302; also foothills of the Chisos Mts., W. Texas, *Havard*, no. 18.

38. **M. minutifolia**, Rob. & Greenm. Shrub armed with straight or slightly recurved infra-stipular subaxillary or scattered spines: pinnæ 10 to 20 pairs; leaflets numerous, not over 1 mm. in length, pubescent upon the edge and lower surface: valves tough, oblong, not constricted between the seeds, apparently falling away entire, at first somewhat canescent-tomentulose as well as covered with tawny or rufescent setæ. — Am. Jour. Sci. ser. 3, l. 150. — Rocky hills, Rio Blanco, Jalisco, *Pringle*, no. 5142, and near Colotlan, *Rose*, no. 2673; the specimens of both collections are in fruit.

= = Pod lanceolate, 2 cm. broad.

39. **M. eurycarpa.** Small tree, 4 to 6 m. high, glabrous or puberulent, sparingly armed with scattered spines or unarmed: branches reddish brown; branchlets green, angulate: stipules setaceous: leaflets narrowly oblong, 6 to 8 mm. in length, 2 mm. in breadth, 1-nerved, rounded at the apex, deep green upon both surfaces: heads numerous, small, fasciculate, racemose at the ends of the branchlets; bracts short scarcely showing in the young heads: calyx fully half the length of the glabrous white 5-lobed corolla: stamens 10: pods large, lance-oblong, acuminate, 6 to 7 cm. long, 2 cm. broad; stipe long and slender; valves echinate, separating entire from the replum, which is weakly armed on one side. — Collected by *E. W. Nelson* between Guichocovi and Lagunas, Oaxaca, at 175 to 275 m. altitude, 27 June, 1895, no. 2741; also between La Venta and Niltepec, at 60 m. altitude, 14 July, 1895, no. 2798. Mr. Nelson's no. 955 without fruit is probably the same.

++ ++ Pubescence not rufous: pod surrounded by a lacerate wing; valves neither setose nor spinose.

40. M. lacerata, Rose. Stout shrub, 15 to 25 dm. high, armed with pairs of dark brown laterally compressed very broad based infra-stipular spines: pinnæ 5 to 9 pairs; leaflets 8 to 17 pairs, canescent-puberulent: legumes brown, oblong, obtuse at the apex and base, 4 to 5 cm. long, 1.5 cm. broad, including the lacerate wings. — Contrib. U. S. Nat. Herb. v. 141. — Vicinity of Piaxtla, Puebla, at 1200 m. altitude, *Nelson*, no. 2008; also on limestone hills between Tehuacan, Puebla, at 1850 m. altitude, *Pringle*, no. 6247 (distributed by clerical error as *M. lacerans*).

+++ Pubescence rufous, dense.

41. M. mollis, Benth. Pinnæ 4 to 5 pairs; leaflets 6 to 10 pairs, oblong, villous upon both sides, 8 to 12 mm. long: heads fascicled at the nodes; flowers villous. — Benth. in Hook. Jour. Bot. iv. 408, & Trans. Linn. Soc. xxx. 429. — Mexico, *Andrieux*, no. 400. Species not seen by the writer; the description compiled.

42. M. Galeottii, Benth. Tall shrub or small tree, 3.5 to 4.5 m. high, with stoutish flexuous branches: branchlets densely covered with short rufous thickish hairs: spines infra-stipular and geminate or solitary: leaves subsessile, 6 to 10 cm. long; pinnæ 20 to 25 pairs, 10 to 18 mm. long; leaflets about 16 pairs, 2 to 3 mm. long, nearly glabrous except upon the shortly ciliate margins: peduncles fascicled in the axils, 14 to 17 mm. long, copiously and retrorsely pubescent with thick tawny hairs: flowers yellowish turning roseate: pod (acc. to Benth.) broadly linear, glandular-puberulent, setose-prickly upon the sutures, almost naked on the valves. — Benth. in Hook. Lond. Jour. Bot. v. 92, & Trans. Linn. Soc. xxx. 429. *Acacia hirta*, Mart. & Gal. Bull. Acad. Brux. x. pt. 2, 318. — Forests of Yolotepeque, western Cordillera of Oaxaca, altitude 2460 m., *Galeotti*, no. 3165. It cannot be doubted that this species is also represented by Mr. Pringle's no. 6384 collected on mountain sides above Cuernavaca at 2150 m. altitude. This number was unfortunately distributed as *M. lacerans*, Rose, n. sp.?

++ ++ ++ ++ Pubescence not rufous: pod (still unknown in *M. tenuiflora*) often armed upon the margin, but neither surrounded by a wing nor setose upon the valves.

= Pinnæ a single pair; leaflets 1 pair on each secondary rhachis, obovate, or suborbicular, 2 to 4 mm. in length.

43. M. zygophylla, Benth. Small much-branched shrub with single intra-nodal spines: petioles short, thickish, somewhat flattened;

small leaflets obovate or suborbicular, 2 to 4 mm. in diameter: pods unarmed or rarely bearing a few marginal spines. — Benth. in Gray, Pl. Wright. i. 61, & Trans. Linn. Soc. xxx. 425. — Common on limestone hills of Northern Mexico; near Monterey, *Gregg*, no. 182; Saltillo, *Wislizenus*, no. 300, *Gregg;* Parras, *Palmer*, no. 296 (coll. of 1880); Carneros Pass, *Pringle*, nos. 2851, 3703.

= = Pinnæ 1 pair; leaflets 2 to 4 pairs, obovate or suborbicular, 2 cm. in length.

44. **M. leucænoides**, Benth. Tall shrub or small tree, 3 to 4.5 m. in height, unarmed: petioles rather short (1 cm. in length): leaflets at first puberulent, later glabrate, lucid, subcoriaceous, veiny: heads axillary, racemose and subcorymbose at the ends of the branches: legume 5 to 6.5 cm. long, 4 to 8 mm. broad, unarmed. — Benth. in Hook. Lond. Jour. Bot. v. 89, & Trans. Linn. Soc. xxx. 421. — Zimapan, *Th. Coulter*, and Mexico without locality, *Karwinski*, acc. to Hemsl. *Pringle's* no. 3750 collected on limestone ledges at Las Palmas, San Luis Potosi, doubtless represents this species.

= = = Pinnæ 1 to ∝ pairs; leaflets 2 to ∝ pairs, oblong to elliptic, mostly small.

a. Branchlets, petioles, and rhachises glabrous even under lens.

1. Spines infra-stipular, geminate.

45. **M. tenuiflora**, Benth. Stipules setaceous: pinnæ 1 to 3 pairs, obliquely oblong: peduncles somewhat longer than the leaves, the upper ones racemose. — Benth. in Hook. Lond. Jour. Bot. v. 92, & Trans. Linn. Soc. xxx. 429. — Zimapan, Mexico, *Th. Coulter;* Mexico without further locality, *Karwinski*, acc. to Benth. Species not seen by the writer; the description compiled.

2. Spines (with rare exceptions) single, borne at the side of the axil and 30° to 120° removed from it.

46. **M. borealis**, Gray. Shrub, 1.5 to 2.5 m. high: leaves small; pinnæ mostly a single pair; leaflets 3 to 5 pairs, oval, 2 to 4 mm. long, two thirds as broad, thickish, glaucescent: peduncles very slender, 12 to 18 mm. long: legumes 2.5 cm. or more long, unarmed or more often armed on one or both edges; segments about 4, rounded at the sides. — Pl. Fendl. 39, & Pl. Wright, i. 61 (excl. var.), ii. 51; Benth. Trans. Linn. Soc. xxx. 426, t. 66. *M. fragrans*, Gray, Pl. Wright, ii. 51, not Pl. Lindh. — W. Texas, *Wright*, *Hayes*, no. 220, *Havard*, no. 68; New Mexico, *Fendler*, no. 181, *Wright*, no. 1038, northward to Cimarron Valley, Indian Terr., *Carleton*, acc. to Holzinger. Perhaps only a variety of the next.

47. **M. fragrans**, Gray. Fragrant shrub, 6 to 12 dm. or more

high, in technical characters too close to the last preceding species, but with much more developed foliage: pinnæ 1 to 3 pairs, oblong, 2 to 3 cm. in length; leaflets in about 6 somewhat remote pairs, oblong, 4 to 6 mm. in length: legumes curved, about 5 cm. long, slightly or not at all armed; segments 5 to 7. — Pl. Lindh. pt. 2, 182, as to plant of Lindh.; Benth. Trans. Linn. Soc. xxx. 426. — Thickets on rocky soil, S. and W. Texas, *Lindheimer*, nos. 606, 607, *Wright*, no. 1037, *Reverchon*, no. 717 * (of Curtiss' distrib.), *Havard*, no. 63, *Heller*, no. 1594.

b. Branchlets, petioles, or at least rhachises puberulent to tomentose.

1. Pods thin and soft in texture, wholly unarmed, 4 to 5 mm. broad, velvety tomentose.

48. M. calcicola. Shrub 6 to 9 dm. high: branches gray, flexuous, armed with solitary recurved subaxillary spines: pinnæ 2 to 3 pairs; leaflets elliptic-oblong, 2 to 3 pairs, subdistant, at least not crowded, pale green, puberulent, concolorous, 3 to 5 mm. long: peduncles axillary, solitary, puberulent, 8 mm. long; flowers pubescent, white or nearly so: pods 3 to 4 cm. in length, about 6-seeded, slightly constricted between the seeds, light colored, permanently canescent-tomentose. — Collected by *C. G. Pringle*, on calcareous plains of Tehuacan, State of Puebla, at 1525 m. altitude, 29 July, 1897, no. 6765 (distributed as *M. depauperata*?)

2. Pods coriaceous, more or less armed upon one or both edges.

◦ Pinnæ 1 to 2 or rarely 3 pairs; leaflets 2 to 6 pairs.

49. M. depauperata, Benth. Low rigidly branched shrub, becoming 1 m. high, finely canescent-puberulent: spines single, subaxillary: leaves very small; pinnæ a single pair; leaflets 2 or 3 pairs, ovate, not 2 mm. in length; common petiole 6 mm. long, somewhat flattened: peduncles 5 mm. in length: flowers canescent-pubescent: young pods stipitate, 6-jointed, canescent-pubescent upon the valves, aculeate upon one edge, distinctly constricted between the seeds. — Benth. Pl. Hartw. 13, in Hook. Jour. Bot. iv. 410, & Trans. Linn. Soc. xxx. 425. *Acacia canescens*, Mart. & Gal. Bull. Acad. Brux. x. pt. 2, 312. — Plains of Actopan, Mexico, *Graham* (fragmentary specimen in herb. Gray); Mexico without locality, *Karwinski* acc. to Benth.; also from hills near San Juan del Rio, Queretaro, *Pringle*, no. 6352, showing young fruit as above described. A specimen collected on a gravelly mesa near Presidio, Texas, *Havard*, no. 75, has mature glabrate constricted pods (7 mm. in breadth) and the reduced foliage of this species, but somewhat longer peduncles and smoother flowers. Near to and

perhaps confluent with this species are the plants referred by Dr. Gray to his *M. borealis* var.? *Texana*, Pl. Wright, i. 61 (*Wright* no. 159, also no. 10, coll. of 1851, and *Gregg*, no. 51). They differ from *M. borealis* in their puberulent rhachises and subaxillary spines, but are to a certain extent intermediate between *M. depauperata* on the one hand and *M. acanthocarpa* and *M. biuncifera* on the other. Without better and more copious material their affinities and proper status cannot be more exactly determined.

50. M. Pringlei, Wats. Branching shrub armed with mostly geminate infra-stipular spines: pinnæ 1 to 2 pairs; leaflets 2 to 4 pairs, elliptical or oval, pale green: flowers canescent-puberulent; bracts inconspicuous: pods glabrous, 2 cm. long, acute, slightly armed on one edge or unarmed. — Proc. Am. Acad. xxi. 452. — Near Big Cañon of the Rio Grande, W. Texas, *Havard*, no. 12, and on rocky hills near town of Chihuahua, *Pringle*, in fruit, October, no. 545, and in flower, August, no. 724.

° ° Pinnæ (at least on well developed leaves) 3 to ∝ pairs; leaflets mostly numerous.

\+ Pods 7 to 10 mm. broad, mostly obtuse or obtusish.

52. M. Grahami, Gray. Stem nearly glabrous: primary rhachises (nearly 1 dm. in length) sparingly pubescent; pinnæ about 10 pairs; leaflets 15 to 20 pairs narrowly oblong, of firm texture, paler and prominently veined beneath, entirely glabrous upon both surfaces, usually devoid even of ciliation: pods glabrous at maturity. — Pl. Wright. ii. 52. — Mountain valleys of Northern Sonora, near the Arizonan boundary, *Wright*, no. 1042.

53. M. Lemmoni, Gray. Apparently an undershrub, covered with soft and canescent pubescence or tomentum: pinnæ about 6 pairs; primary rhachis 6 to 10 cm. long; secondary rhachises often 4 cm. in length; leaflets elliptic-oblong, pubescent-tomentose, 5 to 7 mm. in length: heads numerous, globular, borne on filiform geminate peduncles which are sometimes grouped in showy compound racemes: pods even at maturity canescent-tomentose. — Proc. Am. Acad. xix. 76. — Huachuca Mountains, Arizona, *Lemmon*, nos. 2692, 2693, *Pringle*, no. 7, *Toumey*, no. 39. Too near the next, from which it differs chiefly in its smaller spines, less woody stems, and larger less crowded leaflets.

54. M. acanthocarpa, Benth. Stems and branches decidedly ligneous: spines mostly numerous, slender or stout, usually paired and infra-stipular, with or without a third one beneath the leaf-insertion; scattered spines sometimes present also: leaves (except on young and

vigorous shoots) seldom exceeding 4 cm. in length; pinnæ 4 to 10 pairs; leaflets oblong, crowded, ciliate, pubescent, 4 to 5 mm. long: pods oblong, straight or nearly so, armed on one or both edges, canescent-tomentose, at least when young, obtusish but mucronate-tipped. — Benth. in Hook. Jour. Bot. iv. 409, & Trans. Linn. Soc. xxx. 428; Wats. Proc. Am. Acad. xvii. 350. *M. biuncifera*, Torr. Bot. Mex. Bound. 61, in part, acc. to Wats. Bibl. Index, 243. — Mexico without locality, *Graham;* San Luis Potosi, *Schaffner*, no. 624; Jalisco, *Rose*, no. 2572; Durango, *Rose*, no. 3491, and (acc. to Benth.) nos. 301 and 308 of Mex. Bound. Survey. Bourgeau's no. 486, referred to this species, should be placed in *M. biuncifera*.

++ Pods 4 to 6 mm. broad, mostly acute or acutish.

55. **M. prolifica**, Wats. Shrub armed with long slender straight geminate spreading infra-stipular spines: leaf-rhachis 4 to 6 cm. in length, pubescent, armed with hooked spines; pinnæ about 8 pairs; leaflets 8 to 18 pairs, oblong, acutish, ciliate or quite glabrous, 3 mm. in length: pods copious, falcate, narrowed to a point at both ends, armed upon the ventral (convex) suture. — Proc. Am. Acad. xxi. 452. — Rocky hills near Chihuahua, *Pringle*, no. 208 in flower, no. 372 in fruit. A species too near the variable *M. biuncifera*, and distinguished from it chiefly by its larger leaves and long slender straight spines.

56. **M. biuncifera**, Benth. Straggling shrub or small tree: spines usually broad, laterally compressed, paired and infra-stipular, or single and infra-axillary, or rarely occupying both positions: primary leaf-rhachis 6 to 31 mm. long; pinnæ 3 to 9 pairs; leaflets 5 to 13 pairs, oblong, 2 to 3 mm. in length: flowers canescent-puberulent or -tomentulose: pods about 6-seeded, usually more or less constricted between the seeds, puberulent or rarely tomentulose, seldom over 5 mm. broad. — Pl. Hartw. 12, in Hook. Jour. Bot. iv. 409, & Trans. Linn. Soc. xxx. 428; Gray, Pl. Wright. i. 61, ii. 51. — Rocky ground on foothills and mountains, W. Texas, *Wright*, to Arizona, *Rothrock*, *Pringle*, *Palmer*, *Toumey:* Mexico, Chihuahua, *Pringle*, no. 367: San Luis Potosi, *Parry* & *Palmer*, nos. 215, 216; Durango, *Palmer*, no. 328 (with small fruit), 594; Jalisco, *Pringle*, no. 6199; State of Mexico, *Andrieux*, no. 399, *Bourgeau*, no. 486? *Pringle*, no. 6308; Oaxaca, *Nelson*, no. 1571. Variation striking but mostly permiscuous and not yet subject to clear definition.

Var. **flexuosa**. More slender: branches flexuous or almost geniculate: leaflets minute, 1 to 1.5 mm. long: flowers canescent-tomentulose as in the typical form. — *M. flexuosa*, Benth. in Gray, Pl. Wright. i. 62,

& Trans. Linn. Soc. xxx. 428. — W. Texas, *Wright*, no. 161; New Mexico, *Wright*, no. 1365.

Var. Lindheimeri. Inconspicuously puberulent but with flowers nearly or quite glabrous: mature leaflets 3 to 4 mm. long. — *M. Lindheimeri*, Gray, Pl. Lindh. pt. 2, 181; Benth. l. c. 429. — W. Texas, *Lindheimer*. Mr. Pringle's no. 5152 from Michoacan is essentially the same.

* * * Herbs, undershrubs, or soft-woody often scandent shrubs, frequently setiferous or strigose.

← Corolla multistriate.

57. M. somnians, H. & B. Undershrub, glabrous to densely glandular-villous, armed with straight scattered usually infrequent spines: pinnæ 2 to ∝ pairs; leaflets 12 to 28 pairs, linear-oblong, 2 to 4 mm. long: pods long-stiped, linear or narrowly oblong, acute, 8–11-seeded, glabrous to glandular-pilose. — H. & B. in Willd. spec. iv. 1036; Kunth, Mim. 20, t. 7; Benth. Trans. Linn. Soc. xxx. 434. *M. palpitans*, H. & B. l. c. *M. somniculosa*, HBK. Nov. Gen. & Spec. vi. 257. *M. acutiflora* & *M. podocarpa*, Benth. in Hook. Jour. Bot. iv. 397. — Widely distributed in Trop. America, and reaching Central America and S. Mexico: Oaxaca, *Nelson*, no. 2723 (smoothish form), no. 881 (glandular form); Guatemala, *Hayes*, and no. 6104 of J. D. Smith's set; Panama, *Seemann*, no. 105.

58. M. trijuga, Benth. Unarmed undershrub? pinnæ 3 to 4 pairs: leaflets 30 to 50 pairs: pod glabrous. — Benth. in Hook. Jour. Bot. iv. 398, & Trans. Linn. Soc. xxx. 434. — Tropical America, extending to Panama, *Hayes*, acc. to Benth. from whom the description is compiled.

← ← Corolla not striate: stems strongly angled, and angles armed with short recurved spines.

↔ Canescent-tomentose to glabrous: leaflets obovate or elliptic: spines of the upper part of the stem and peduncles not especially numerous or conspicuous.

59. M. malacophylla, Gray. Tomentose: stems 2 to 5 m. long, climbing over shrubs: primary leaf-rhachis 1 to 1.5 dm. long; pinnæ 3 to 6 pairs; leaflets 4 to 6 pairs; distinctly although obtusely pointed, mucronate: pods more or less constricted between the seeds, 5 to 7.5 cm. long, 8 to 10 mm. broad, 5–8-jointed, smooth; valves disarticulating between the seeds. — Pl. Lindh. pt. 2, 182, & Pl. Wright. i. 52; Benth. Trans. Linn. Soc. xxx. 423. — S. W. Texas, in the valley of the Rio Grande, *Wright*, no. 164; Mexico, Nuevo Leon, *Gregg*, no. 207, *Pringle*, no. 1905; Coahuila, *Palmer*, no. 299 (coll. of 1880); Chihuahua, *Bigelow*, no. 319.

Var. glabrata, Benth. Stems, &c., merely puberulent: leaflets somewhat larger, green and glabrous, mucronate as in the typical form. — Benth, l. c. *M. malacophylla*, var. *glabra*, Gray in Torr. Bot. Mex. Bound. 61 (name only). — On the lower Rio Grande, *Schott, Miss Croft*, and earlier at San Fernando, Tamaulipas, *Berlandier*, nos. 815, 2235.

60. M. polyancistra, Benth. Climbing (?) glabrous shrub: spines small, numerous, recurved: pinnæ 3 to 7 pairs; leaflets 6 to 8 pairs, oblique, obovate-oblong, mucronate. — Trans. Linn. Soc. xxx. 422. — "New Spain," *Pavon*. Description compiled.

++ ++ Tawny-tomentose: leaflets oblong: spines on the upper part of the stem and peduncles not conspicuous.

61. M. Ervendbergii, Gray. Pinnæ about 5 pairs; petiole and primary rhachis 1 dm. long, armed (as in related species) by numerous short recurved spines; leaflets about 12 pairs, 7 to 10 mm. long, 3 mm. broad, acutish at the apex, oblique at the base, discolorous, sordid-tomentose beneath: heads numerous, paniculate; peduncles 2 cm. long, unarmed: fruit unknown. — Proc. Am. Acad. v. 178, in part. *M. costaricensis*, Benth. Trans. Linn. Soc. xxx. 423, ex char. — Wartenberg near Tantoyuca, Huasteca, Mexico, *Ervendberg*, no. 2 (herb. Gray) in part. This species was founded upon mixed material and it is now clear that the specimen to which Dr. Gray referred when he mentioned the young leaves is *M. invisa*, H. & B. Bentham seems never to have understood Dr. Gray's species, referring to it *Schrankia elata*, Mart. & Gal. which from its armed peduncles cannot be the plant here retained as *M. Ervendbergii*, nor from its arborescent habit is likely to have been the other component of Dr. Gray's type. Furthermore Bentham also described *M. costaricensis*, which in all characters mentioned corresponds accurately to *M. Ervendbergii*, as here interpreted. If, as is surmised, *M. costaricensis* proves identical, the range of the species may be extended to Costa Rica, where coll. by *Oersted*, and Guatemala, *Salvin*, acc. to Hemsl.

++ ++ ++ Loosely pubescent: leaflets linear to linear-oblong: upper part of the stem and often peduncles covered with very numerous reflexed stramineous spines.

62. M. invisa, Mart. Petioles rather long, copiously armed; pinnæ 4 to 8 pairs; leaflets 12 to 25 pairs, 3 to 4 mm. long, 1 mm. broad: heads in simple elongated terminal raceme; peduncles very short, villous and often armed; heads rose-purple. — Herb. Fl. Bras. 121; Benth. Trans. Linn. Soc. xxx. 436. *M. diplotricha*, Wright in Sauv. Pl. Cub. 34, acc. to Benth. *M. Ervendbergii*, Gray, l. c. in part. *Schrankia*

brachycarpa, Benth. in Hook Jour. Bot. ii. 130, iv. 415. — Tropical America: S. Mexico, Huasteca, *Ervendberg;* Guatemala, nos. 211 & 6105 of J. D. Smith's sets.

A noteworthy form, coll. at Mazatlan, Sinaloa, *Lamb*, No. 329 (distrib. as *M. Ervendbergii*) has straighter spines and longer less pubescent unarmed peduncles.

+ + + Corolla not striate: pubescence not strigose: spines scattered, not seriate: pods short, 1–3-jointed, narrow, not over 5 mm. in breadth.

++ Densely villous with long spreading yellowish hairs.

63. **M. camporum**, Benth. Prostrate, nearly herbaceous, scarcely armed: stipules ovate, striate: pinnæ about 6 pairs; leaflets numerous, narrowly oblong: heads large, many-flowered, oval, including the long stamens 2.5 cm. in diameter; bracts long and conspicuous in the young heads, imbricated, ciliate, tawny-villous: pods 6 to 12 mm. long, 4 mm. broad. — Benth. in Hook. Jour. Bot. ii. 130, iv. 403, *M. flaviseta*, Benth. in Hook. Lond. Jour. Bot. v. 90. *M. æschynomenes*, Benth. Bot. Sulph. 89. — Acaponeta, Tepic, *Rose*, nos. 3116, 3295; Realejo, Nicaragua, *Hinds*, *Sinclair*, acc. to Hemsl. (Trop. Am.)

++ ++ Hispid with a few scattered setose spines, and sparingly pubescent.

64. **M. pusilla**, Benth. Prostrate annual: pinnæ 1 to 9 pairs, leaflets 6 to 12 pairs, oblong, 4 mm. long, heads small, few-flowered, 6 mm. in diameter; peduncles 1 cm. or less in length: pods 2–3-jointed, setulose on margin or valves, 3 or 4 mm. in breadth. — Bot. Sulph. 90. — Acapulco, *Palmer*, no. 9 (coll. of 1894–1895); Realejo, *Sinclair*, *Hinds*, acc. to Benth. & Hemsl. Although I have seen no authentic specimens of this species, I cannot doubt that it is represented by Dr. Palmer's specimen.

+ + + + Corolla not striate: pubescence usually strigose: pods 1-∝-seeded, 8 to 14 mm. broad.

++ Prostrate, herbaceous or nearly so: leaf-rhachis unarmed: pods 2–4-seeded.

65. **M. strigillosa**, Torr & Gray. Often rooting at the joints, scarcely or not at all armed: heads large, oval, usually long-peduncled: pods 2.5 cm. in length, oblique at the summit, acutish, setose throughout. — Fl. i. 399; Chapm. Fl. 115. — Pine barrens and hummock lands of Florida, westward to W. Texas: adjacent Mexico, *Berlandier*, *Gregg*, *Palmer*.

++ ++ Ascending or erect, suffruticose: leaf-rhachis armed with opposite acicular spines between the pinnæ; stipels also spinescent: pods short 1–3-seeded, obovate with broad oblique summit.

66. **M. dormiens**, H. & B. Whole habit and foliage of the following more abundant species, but softer appressed-villous rather than

strigose pubescence, and strikingly different fruit. — H. & B. in Willd. Spec. iv. 1035; Benth. Trans. Linn. Soc. xxx. 435. *M. humilis*, H. & B. l. c. 1037. *M. intermedia*, Kunth, Mim. 16, t. 6. — Near Tapachula, Chiapas, *Nelson*, no. 3851; Central America, Herb. Pavon, acc. to Hemsl. (Trop. Am.)

++ ++ ++ Ascending or erect, suffruticose: leaf-rhachis usually armed by pairs of spines between the pinnæ; pods oblong, elongated, 4 to 9 cm. in length.

67. M. asperata, L. Strigose-hirsute: branches thickish, sub-herbaceous, pithy, armed with scattered or opposite, laterally compressed broad-based brown or light gray spines: pinnæ 4 to 9 pairs; leaflets 12 to 40 pairs, linear-oblong, acutish, crowded, puberulent, ciliolate: peduncles rather stout, 2 to 5 cm. long; pods oblong, rounded and mucronate at the apex, covered throughout by short stiffish upcurved tawny hairs: valves dividing into 15 to 20 short broad segments. — Syst. Nat. ed. 10, 1312; Benth. l. c. 437 (where extensive synonymy is cited); *M. pigra*, L. l. c. *M. polyacantha*, *hispida*, & *canescens*, Willd. Spec. iv. 1034–1038. *M. pellita*, H. & B. in Willd. l. c. 1037; Kunth, Mim. 27, t. 9. — Widely spread in the tropics of both hemispheres. Mexico, between San Luis Potosi and Tampico, *Palmer*, no. 1037 (coll. of 1878–1879); Jalisco, *W. G. Wright*, no. 1335, *Rose*, nos. 1422, 1564, *Nelson*, no. 4136; Colima, *Palmer*, no. 1377; Vera Cruz, *Bourgeau*, no. 2209, *Nelson*, no. 526, *C. L. Smith*, no. 998; borders of Oaxaca, *Nelson*, nos. 2333, 2856; Guatemala, nos. 1735 and 3294 of J. D. Smith's sets; Panama, *Fendler*, no. 98, *Seemann*, no. 527.

Var. Berlandieri. Less pubescent: stems merely strigillose: leaves shorter than in the typical form; pinnæ 4 to 6 pairs; primary rhachis only 3 to 5 cm. long, mostly unarmed: pods sparingly hispid with short more or less strigose hairs, segments of the valves 8 to 15. — *M. Berlandieri*, Gray in Torr. Bot. Mex. Bound. 61; Benth. l. c. 423. — Valley of the Rio Grande, near Matamoras, *Berlandier*, no. 3146; Micos, San Luis Potosi, *Pringle*, no. 3798. Careful search fails to show any significant or constant difference between this and *M. asperata*, which can be regarded as a specific distinction. Mueller's no. 90 from Vera Cruz, Hartmann's no. 519 and Lamb's no. 511 from Sinaloa, show clear transitions to the typical form.

II. REVISION OF THE NORTH AMERICAN SPECIES OF NEPTUNIA.

Neptunia, Lour. (Dedicated to *Neptune* from the preference for aquatic habitat.) — Unarmed aquatic or terrestrial perennials, herbaceous or suffrutescent. Leaves bipinnate, more or less sensitive; leaflets small, oblong, sometimes glandular at the base. Flowers small, aggregated in dense globose, ovoid, or short-cylindric heads; the lowest flowers frequently sterile and with each filament broadened into a conspicuous linear-lanceolate yellow lamina. Fruit strongly compressed, several-seeded, more or less stipitate. — Fl. Cochinch. 653; Benth. in Hook. Jour. Bot. iv. 354–356, & Trans. Linn. Soc. xxx. 383–385; Coult. Contrib. U. S. Nat. Herb. ii. 95, *Desmanthus* § *Neptunia*, DC. Prodr. ii. 444. *Hemidesmas*, Raf. Sylv. Tell. 119. — About 9 species of the warmer parts of both Old and New World.

N. OLERACEA, Lour. l. c. 654, a tropical floating species with enlarged spongy stems (often 1 cm. thick) has been thought to occur in Texas, see Griseb. Fl. W. Ind. 217, but no specimens from the U. S. have been available. (Mex., *Rovirosa*, W. Ind., S. Am., Tropics of Old World.)

* Heads large, subcylindric, about 50-flowered: lower flowers more often uniform with the rest: bracts lanceolate, inconspicuous.

N. lutea, BENTH. Pubescent with rather fine weak spreading hairs: stems prostrate, branched, 9 to 15 dm. long: leaves with 3 to 5 pairs of pinnæ; leaflets 8 to 16 pairs, rounded at the ends, pubescent and ciliolate, 3 to 7 mm. long; stipules small, ovate-lanceolate, chestnut-colored: peduncles axillary, 5 to 7.5 cm. in length, 12 to 16 mm. in breadth, commonly pubescent, 3–9-seeded; stipe often 8 mm. long. — Benth. in Hook. Jour. Bot. iv. 356, & Trans. Linn. Soc. xxx. 384. *Mimosa virgata*, Batr. Trav. 421, acc. to Wats. Bibl. Index, 244. *Acacia lutea*, Leavenw. Am. Jour. Sci. vii. 61, acc. to Torr. & Gray, Fl. i. 403, but originally described as glabrous and with shorter peduncles. *Darlingtonia virgata*, Raf. New Fl. pt. 1, 43, acc. to Wats. l. c. — Moist and clayey soil, S. Missouri, *Bush*, to Texas, "Alabama, *Leavenworth*," and Florida, *Leavenworth*, but apparently rare southeastward. Var. TENUIS. Closely similar but with stems and peduncles nearly or quite glabrous. — *N. tenuis*, Benth. ll. cc. — Texas, *Drummond*, no. 150 of 3rd collection, *Berlandier*, no. 1602 near Austin and no. 1851, also *Lindheimer*, no. 48, and *Hull*, at Hemstead, no. 178.

**** Heads considerably smaller, ovoid, about 20-flowered; the lowest flowers often with yellow petaloid filaments: bracts ovate, acuminate.**

+ Bracts and calyx-lobes ciliolate.

N. pubescens, BENTH. Habitally similar to the preceding, finely pubescent or at length only glandular-roughened: pinnæ only 2 or 3 pairs but leaflets more numerous (15 to 35 pairs), ciliolate upon the margin but not otherwise pubescent; stipules larger than in the preceding species, ovate, acuminate, yellowish-brown or greenish: legumes rather short and broad (about 10 mm. in breadth), 3–8-seeded, more or less pubescent; the stipe only a line or two in length. — Benth. in Hook. Jour. Bot. iv. 356, & Trans. Linn. Soc. xxx. 384 (excl. pl. of Florida and perhaps of W. Ind.); Coult. l. c. *N. lutea*, Torr. Bot. Mex. Bound. 60, in part, acc. to Wats. Bibl. Index, 244. — S. and W. Texas, from Corpus Christi Bay, *Palmer*, to Eagle Pass, *Havard*, and perhaps farther westward, *Wright*, (Mex., W. Ind.). This of all our plants appears to correspond most closely to specimens from Peru whence the species was originally described.

N. Lindheimeri. Diffusely branched from a lignescent base, conspicuously and persistently pubescent: pinnæ 3 to 5 pairs; leaflets 15 to 30 pairs, strongly ciliated on the margin and also pubescent upon the lower surface, especially near the apex; stipules, bracts, and even the calyx-lobes conspicuously ciliated: fruiting peduncles 2.5 to 6.5 cm. long: pods regularly oblong, cuneate at the base, 2.5 to 3.8 cm. long, 8 mm. broad, more or less pubescent even in age, 3–10-seeded; stipe about 4 mm. long. — *N. lutea*, Heller, Contrib. Herb. Frankl. & Marsh. Coll. i. 45, not Benth. — Prairies of Texas, about Houston, *Lindheimer*, June, 1843, Texas without locality, *Wright*, and near Corpus Christi, *Heller*, no. 1822.

+ + Bracts and calyx-lobes not ciliolate.

N. floridana, SMALL. Very slender and apparently very sensitive: stems branched, 6 dm. or more long, prostrate, glabrous: pinnæ 3 to 4 pairs; leaflets numerous (15 to more often) 20 to 40 pairs, ciliolate but not otherwise pubescent: peduncles long, at anthesis often hooked at the apex, in fruit 7.5 to 10 cm. in length: bracts and calyx-teeth quite devoid of ciliation: pods about 3.2 cm. long, 6 mm. broad, sparingly pubescent when young, soon glabrate, 7–9 seeded; stipe 2 to 6 mm. in length. — Bull. Torr. Club, xxv. 138. *N. pubescens*, Benth. Trans. Linn. Soc. xxx. 384, in part (as to pl. Rugel). *N. lutea*, Chapm. Fl. ed. 1 & 2, 117, at least in part, not Benth. *Acacia lutea*, Torr. & Gray, Fl. i. 403, as to pl. from Florida. *Desmanthus luteus*, Chapm.

Fl. ed. 3, 128, at least in part, not Benth. — Florida, St. Marks, *Rugel*, 1843; Apalachicola, *Chapman;* Miami, *Garber*, 1877; rocky pine woods between everglades and Biscayne Bay, *Curtiss*, no. 726; hummock land in clayey soil, near Eustis, *Nash*, no. 686; also collected in Mississippi at Ocean Springs, *Pollard*, no. 1104 (distrib. as *Acuan Illinoensis*), and in Louisiana, *Hale*. (St. Domingo, *Eggers*, no. 2552; Cuba, *Wright;* S. Am.?) Chiefly distinguished by its elongated peduncles and unciliated calyx.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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By J. M. Greenman.

Presented by B. L. Robinson, April 13, 1898.

I.—REVISION OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF GALIUM AND RELBUNIUM.

A preliminary study of the Mexican and Central American species of *Galium* has made it necessary to take into consideration the North American representatives of the nearly allied genus *Relbunium*. The latter, although not so numerously represented in Mexico, increases southward and attains its maximum in South America, where it to a considerable extent replaces the genus *Galium*.

Relbunium was first so designated by Endlicher,[1] as a section under *Galium*. Subsequently it was taken up by Bentham and Hooker,[2] and established as a genus; a similar view being held by Schumann[3] and by Hemsley,[4] while Dr. Gray in the Synoptical Flora placed the North American representatives of *Relbunium* under *Galium*.

The typical *Relbunium*, however, is so well marked by its involucrate flowers and distinctly axillary inflorescence, that it has seemed best to the writer in the following synoptic revision to follow essentially the generic limitations laid down by Bentham and Hooker, and by Schumann in Engler and Prantl's Nat. Pflanzenfamilien.

It may be added that in the examination of a large number of specimens no difficulty whatever was experienced in placing a given specimen definitely either in one genus or in the other, except in the case of *G. angulosum*. This species is somewhat intermediate between the two genera, but a close examination of the inflorescence seems to indicate its affinity with *Galium* rather than with *Relbunium*.

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[1] Gen. Pl. 523.

[2] Gen. ii. 149.

[3] Fl. Bras. vi. pt. 6, 103; Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 4, 154.

[4] Biol. Cent.-Am. Bot. ii. 62.

It will be noticed that a few species are herein treated which have not as yet been reported from Mexico or Central America. In these cases the known locality is such that the occurrence of the species may be expected in Northern Mexico. Besides the material in the Gray Herbarium, the writer, through the kindness of Dr. J. N. Rose, has been permitted to borrow from the U. S. National Museum for examination the Mexican and Central American specimens of these two genera.

GALIUM, Linn. (Name from ancient Greek *γάλιον*, supposed to be *Galium verum*, and derived by Dioscorides from *γάλα*, milk, which it was used to curdle.) Flowers perfect, polygamo-diœcious, or unisexual, exinvolucrate. Calyx-tube ovoid or globose; limb obsolete. Corolla rotate, usually 4-lobed (not unfrequently 3-lobed, and rarely 5-lobed); lobes valvate. Stamens of the same number and alternating with the lobes of the corolla, adnate to the base of the tube: anthers on short filaments, exserted. Disk annular. Ovary 2-celled; styles more or less 2-cleft; stigmas capitate; ovules solitary in the cells, borne on the dissepiment, amphitropous. Fruit didymous, dry, subcarneous, or distinctly baccate, smooth, tuberculate, or hispid, separating into closed carpels, or only one carpel maturing. Seeds concave on the face; embryo curved; cotyledons foliaceous; radicle inferior. — Annuals, herbaceous perennials, or rarely suffruticose plants. Leaves in whorls of 3 to many. Flowers usually disposed in axillary or terminal cymes, occasionally simply axillary, or terminal, white, yellow, greenish, or purplish. — Gen. 24; Benth. & Hook. f. Gen. ii. 149; Gray, Syn. Fl. N. A. i. pt. 2, 35 (excl. § *Relbunium* in part); Schumann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 4, 149. For generic synonyms, which relate chiefly to the Old World, see Hooker f. & Jackson, Index Kewensis, i. pt. 2, 991.

§ 1. Fruit uncinate-hispid, or granular-papillose.

* Leaves in whorls of six or eight (rarely of ten or more); the angles of the stem as well as the midrib and margins of the leaves usually retrorsely aculeolate-hispid, less frequently smoothish, or rarely (in *G. triflorum*) somewhat hirsute.

+ Stems smoothish, or rarely somewhat hirsute-pubescent.

G. TRIFLORUM, Michx. Herbaceous: stems more or less pubescent: leaves elliptic-lanceolate to narrowly oblong-lanceolate, cuspidate-acuminate, 1.5 to 4 or rarely 8 cm. long, 5 to 10 or rarely 15 mm. broad, usually covered on the upper surface near the margin with subappressed hispidulous hairs, often slightly hispid on the midrib, otherwise glabrous: inflorescence cymose, terminal, usually 3-flowered. — Fl. i. 80; Willd. Hort. Berol. t. 66; DC. Prodr. iv. 601; Torr. & Gray, Fl. ii. 23;

Gray, Syn. Fl. N. A. i. pt. 2, 39; Wiegand, Bull. Torr. Club, xxiv. 403. — Common in moist shady places; Southern Greenland and Alaska to the Gulf of Mexico.

This species is doubtfully attributed to Mexico by Hemsley, Biol. Cent.-Am. Bot. ii. 66, but no Mexican specimens have been seen by the writer.

+ + Angles of the stem as well as the margins and midrib of the leaves retrorsely aculeolate-hispid.

++ Fruit granular-papillose.

1. G. asperrimum, Gray. Stems ascending, 3 to 6 dm. high, diffusely branched: leaves usually in whorls of six, oblanceolate, 1 to 2 cm. long, 3 to 6 mm. broad, glabrous except on the margins and midvein beneath: inflorescence cymose-paniculate, cymes dichotomously or trichotomously branching: flowers whitish: fruit about 2 mm. in diameter. — Pl. Fendl. 60, in Brew. & Wats. Bot. Calif. i. 284, & Syn. Fl. N. A. i. pt. 2, 39; Wats. Bot. King Exp. 134; Rothrock in Wheeler, Rep. vi. 138. — New Mexico, *Fendler*, no. 289; Sonora, *Wright*, no. 114; Chihuahua, hills west of the city of Chihuahua, *Pringle*, no. 558; also by the same collector on cool talus of cliffs, on neighboring mountains, no. 740; southwestern Chihuahua, August to November, 1885, *Palmer*, no. 414.

++ ++ Fruit more or less distinctly uncinate-hispid.

2. G. aparine, L. Stems 2 to 10 dm. or more long, somewhat reclining; nodes 2 to 10 cm. distant: leaves oblanceolate or oblanceolate-linear, 1 to 4 cm. long, 2 to 6 mm. broad, cuspidate-acuminate, usually hirsute-pubescent on the upper surface: flowers 1 to 3 in the upper axils, or terminating the lateral branches in 2–3-flowered cymes; corolla small, whitish: fruit 2 to 5 mm. in breadth. — Spec. i. 108; Reichenb. Ic. Fl. Germ. xvii. t. 1197; Gray, Syn. Fl. N. A. i. pt. 2, 36. — Sonora, *Thurber*, no. 437; Lower California, Guadalupe Island, *Palmer*, nos. 35, 850, All Saints' Bay, April, 1882, *Miss F. E. Fish*. — To the var. *Vaillantii*, Koch, Fl. Germ. ed. 1, 330 (Vaill. Par. t. 4, f. 4), some of the specimens above cited may be equally well referred. The variety differs only in being more slender, but as direct transitions occur no satisfactory distinctions can be drawn separating the variety from the species.

3. G. mexicanum, HBK. Stems ascending, much branched, strongly aculeolate-hispid on the angles, hirsute-pubescent at the nodes: leaves usually in sixes or eights, sometimes in whorls of ten or more, 8 to 20 mm. long, 1 to 3 mm. broad, margin revolute, apex strongly cuspidate-acuminate, usually smooth and shining above, rarely somewhat

hirtellous: inflorescence cymose-paniculate: corolla white or purplish, campanulate; lobes revolute, externally pubescent: fruit covered with rather short uncinate-hispid bristles. — Nov. Gen. & Spec. iii. 337; Hemsl. Biol. Cent.-Am. Bot. ii. 65. — Guanajuato, *Dugès;* Valley of Mexico, *Pringle*, no. 6518; Jalisco, Rio Blanco, *Palmer* (collection of 1886), no. 753; Tepic, near Santa Teresa, *Rose*, no. 2151; Orizaba, *Seaton*, no. 127. A specimen from Culiacàn, *Palmer* (collection of 1891), no. 2777, may be doubtfully referred here.

Var. glabratum, Nearly glabrous throughout, otherwise as in the typical form. — Collected by *E. W. Nelson* on the west slope of Mt. Zempoaltepec, Oaxaca, altitude 2370 to 2460 m., 5 to 13 July, 1894, no. 583.

Var. platyphyllum. Similar to the species proper, but with broader oblanceolate or oblong-spatulate leaves, 1 to 2 cm. long, 2 to 6 mm. wide, abruptly cuspidate-acuminate at the rounded summit, not unfrequently hirtellous-puberulent beneath and occasionally hirsutish above. — Chiapas, near Christobal, altitude 2150 to 2704 m., 18 September, 1895, *E. W. Nelson*, nos. 3165, 3200; Oaxaca, Sierra de San Felipe, altitude 3075 m., 28 June, 1894, *Pringle*, no. 5663; vicinity of Yolontepec, altitude 1700 to 2150, 15 to 20 July, 1894, *Nelson*, no. 714; Colima, 9 January to 6 February, 1891, *Palmer*, no. 1407.

* * Leaves in whorls of four: the angles of the stem aculeolate-hispidulous: flowers cymose.

4. G. prætermissum, Greenm. Stems slender, 3 to 4 dm. long, ascending from a perennial base, slightly hispidulous: leaves linear-lanceolate to linear, 8 to 14 mm. long, 1 to 3 mm. broad, acute, margins revolute, upper surface often slightly hispidulous, the lower glabrous: flowers terminating the lateral branches in subtrichotomous cymes. — Proc. Am. Acad. xxxii. 306. — Federal District, *Pringle*, no. 6596.

* * * Leaves in fours: hirsute-pubescent to nearly glabrous plants, not retrorsely aculeolate-hispid: flowers terminating the stems and branches in rather close, or dichotomously branching cymes.

– Flowers paniculately disposed in dichotomously branching leafy cymes: uncinate bristles of the fruit subappressed.

5. G. Pringlei. Stems 3 to 5 dm. high, erect or ascending from a perennial base, covered with a spreading hirsute pubescence: leaves in fours, the uppermost opposite, 1-nerved, oblong-elliptic to oblong-lanceolate, 4 to 12 mm. long, 1 to 5 mm. broad, submucronate, narrowed at the base, hirsute-pubescent upon either surface: flowers sessile or short-pedicelled: corolla whitish: fruit about 1.5 mm. in breadth, covered with

subappressed uncinate hairs. — Collected by *C. G. Pringle* on shaded ledges of the Sierra Madre near Monterey, State of Nuevo Leon, 9 July, 1898, no. 1884, distributed as "*Galium uncinulatum*, DC.?"

+ + Flowers in terminal or lateral few-several-flowered loose cymes: uncinate bristles of the fruit spreading.

6. G. orizabense, Hemsl. An herbaceous perennial: stems 3 to 10 dm. or more long, erect or ascending, hirtellous-pubescent especially on the angles with short recurved hairs: leaves obscurely 3-nerved, linear-lanceolate or linear-oblong, 0.5 to 2 cm. long, 1.5 to 5 mm. wide, obtuse, a little narrowed at the base, usually hirtellous-pubescent upon either surface, and especially on the midrib beneath. — Diag. Pl. Nov. pars tertia, 54, & Biol. Cent.-Am. Bot. ii. 65. — Region of Orizaba, *Sumichrast*, nos. 838, 1933; *Müller*, nos. 1144, 1326; *Botteri*, no. 538.

7. G. uncinulatum, DC. Stems slender, usually several from a perennial base, nearly glabrous or pubescent with spreading or somewhat reflexed hirsute hairs: leaves 3-nerved from the subpetiolate base, oblong to oblong-lanceolate, mucronate, more or less hirsute upon either surface, especially on the veins beneath, sometimes nearly glabrous: inflorescence terminating the lateral branches in three–few-flowered cymes. — Prodr. iv. 600; Hemsl. Biol. Cent.-Am. Bot. ii. 66; Wats. Proc. Am. Acad. xviii. 99. *G. Jalapense*, Schlecht. Linnæa, ix. 591. — Sonora, *F. E. Lloyd*, no. 393; Nuevo Leon, Guajuco, *Palmer*, March, 1880, no. 412; San Luis Potosi, *Schaffner*, no. 840 (a nearly smooth form); Valley of Mexico, *Schaffner*, no. 179, *Pringle*, no. 6462; Orizaba, *Botteri*, nos. 188, 945, 1174, *Müller*, no. 1820, *Seaton*, no. 209, *Sumichrast*, no. 1921; Oaxaca, vicinity of Cerro San Felipe, *Nelson*, no. 1103. Specimens collected by Pringle, San Luis Potosi, no. 5125, and Puebla, no. 7018, seem to connect with the following variety.

Var. obstipum, Wats. Leaves usually smaller, suborbicular to oblanceolate, densely hirsute-pubescent beneath. — Proc. Am. Acad. xviii. 99. *G. obstipum*, and varieties, Schlecht. Linnæa, ix. 592; Hemsl. Biol. Cent.-Am. Bot. ii. 65. — Coahuila, Lerios, about 70 km. east of Saltillo, July, 1880, *Palmer*, no. 413, by the same collector in the Caracol Mts., 33 km. east of Monclova, August, 1880, no. 414; Michoacan, Patzcuaro hills, 8 November, 1890, *Pringle*, no. 3597; Real del Monte, *Th. Coulter*, no. 185; Chiapas. *Ghiesbreght*, no. 886; Guatemala, Coban, Depart. Alta Verapaz, altitude 1325 m., *von Tuerckheim* (Donnell Smith's sets, no. 1222).

Var. (?) nanum. Low, about 1 dm. high: stems glabrous or slightly pubescent at the nodes: leaves oblanceolate, 5 to 10 mm. long,

2 to 3.5 mm. broad, submucronate, narrowed into a subpetiolate base, glabrous or somewhat hirtellous on the upper surface and on the margin, rather densely elongate-punctate: flowers terminating the lateral branches usually in 3-flowered cymes. — Collected about Orizaba by *Müller* in 1885, no. 1523.

+ + + Flowers terminating the stems and branches in small close cymes: uncinate bristles of the fruit spreading.

++ Essentially glabrous: flowers usually white or greenish white.

8. G. Seatonii. Perennial: stems prostrate or ascending, much branched, glabrous: leaves sessile, broadly oblong to oblong-lanceolate, 3 to 10 mm. long, 1.5 to 5 mm. broad, submucronate or short-acuminate, glabrous or slightly hirtellous on the upper surface: corolla about 3 mm. broad, 4-lobed; lobes oblong-ovate, acute: pedicels later becoming somewhat elongated, 3 to 8 mm. in length: fruit 1.5 mm. in breadth. — Mt. Orizaba, altitude 3075 m., 5 August, 1891, *Henry E. Seaton*, no. 174, distributed as *G. uropetalum*, Hemsl.; Federal District, Serrania de Ajusco, altitude 3075 m., 6 September, 1896, *Pringle*, no. 6461, distributed as *G. Jalapense*, Schlecht.

++ ++ Hirsute-pubescent: flowers purplish.

9. G. Nelsonii. Perennial: stems ascending, 1 to 2 dm. in length, more or less branched, hirsute-pubescent upon the angles and also at the nodes: leaves sessile, ovate or slightly oblong-ovate, acute, usually hirsute-pubescent above and on the midrib beneath, margin ciliate: flowers, bracts, and upper leaves purplish: corolla about 3 mm. in diameter, 4-parted; lobes oblong-ovate, obtusish. — Summit of Mt. Zempoaltepec, Oaxaca, altitude 3480 m., 9 July, 1894, *E. W. Nelson*, no. 628.

* * * * Leaves in fours: inflorescence chiefly axillary.

+ Flowers on slender pedicels.

G. TEXENSE, Gray. Annual, branching from the base: stems more or less erect, 1 to 3 or 4 dm. high, hirsute-pubescent: leaves ovate or oblong-ovate, 0.5 to 1.5 cm. long, one half to two thirds as broad, hirsute-pubescent upon either surface: peduncles axillary, slender, about equalling the leaves, occasionally proliferous: fruit 2 mm. in diameter. — Proc. Am. Acad. xix. 80, & Syn. Fl. N. A. i. pt. 2, 36. *G. Californicum*, var. *Texanum*, Torr. & Gray, Fl. ii. 20. *G. uncinulatum*, Gray. Pl. Lindh. ii. 215? not DC. — Texas, *Drummond*, no. 115, *Lindheimer*, no. 619, *Wright* (without number), on rocky hills near Austin, *E. Hall*, no. 274, along Brazos River, Palo Pinto Co., *Reverchon*. No specimens from Mexico, belonging to this species, have been seen by the writer, yet it is altogether probable that the species occurs south of the Rio Grande.

G. CANESCENS, HBK. Stems procumbent, nearly glabrous below, spreading-villous above: leaves ovate, 8 to 10 mm. long, 4 to 5 mm. broad, short-acuminate, 3-nerved, membranous, spreading-villous upon either surface, and upon the midrib beneath, ciliate, later somewhat glabrate: flowers axillary, solitary or terminating the branches in threes: corolla glabrous; lobes ovate, subacuminate. — Nov. Gen. & Spec. iii. 336. No Mexican specimens of this species have been seen by the author. Ghiesbreght's no. 886 from Chiapas, referred by Hemsley, Biol. Cent.-Am. Bot. ii. 64, to the above species, is best referred, as pointed out by Dr. Watson, Proc. Am. Acad. xviii. 99, to *G. uncinulatum*, DC., var. *obstipum*. The above description is drawn from Jameson's specimen collected in the Andes of Ecuador in 1859, which corresponds well with the original description.

\+ + Flowers sessile.

11. G. proliferum, GRAY. Annual, simple or branching from the base: stems ascending or erect, 1 to 4 dm. high, shortly hirsute-pubescent, or nearly glabrous: leaves ovate or oblong-ovate, the lowermost often broadly ovoid and subpetiolate, obtuse, spreading-hirsute upon either surface, often nearly or even quite glabrous: flowers sessile, terminating the rather short lateral subhorizontally spreading branches, the lateral branches often proliferous, bearing a second or even a third flower: corolla white, small: fruit about 3 mm. in breadth on extremely short recurved pedicels, subtended by two or four upturned leaf-like bracts. — Pl. Wright. ii. 67, & Syn. Fl. N. A. i. pt. 2, 37. *G. virgatum*, var. *diffusum*, Gray, Pl. Wright. i. 80. — New Mexico, *Wright*, nos. 1112 (type), 281; Texas, El Paso, *Dr. Dieffendorfer*, also collected in the same locality by *Vasey* in 1881; Arizona, hills near Tucson, 28 April, 1883, *Pringle*, no. 15, on the foothills of the Santa Rita Mountains, 13 May, 1884, *Pringle*, in part; Nuevo Leon, Guajuco, about 40 km. southeast of Monterey, March, 1880, *Palmer*, no. 411.

Var. subnudum. Stem and leaves glabrous: fruit only slightly hirtellous. — Foothills of the Santa Rita Mountains, Arizona, 13 May, 1884, *Pringle*, in part.

G. VIRGATUM, Nutt. Stems simple or branched from the base; branches spreading or erect, 1 to 3 dm. high, somewhat virgate, hirsute-pubescent upon the slightly thickened angles, occasionally nearly glabrous: leaves oblong-linear to oblong-lanceolate, 1 cm. or less in length, 1 to 3 mm. broad, obtusish, usually hirsutish above and on the midrib beneath, ciliate, sometimes nearly glabrous: flowers terminating the extremely short lateral branches or peduncles, appearing axillary, sub-

tended by two leaf-like bracts, the lateral branches or peduncles not proliferous, reflexed in fruit. — Torr. & Gray, Fl. ii. 20; Gray, Pl. Lindh. ii. 215, & Syn. Fl. N. A. i. pt. 2, 36. *G. Texanum*, Scheele, Linnæa, xxi. 597. — Louisiana, *Hale;* Texas, *Lindheimer*, nos. 246, 491, *Drummond*, no. 111, *Wright* (without number), at Belknap, *Sutton Hayes*, no. 327 in part, Dallas, May, 1875, *Reverchon*, *Heller*, no. 1437 (distributed as *G. Texense*, A. Gray); Missouri, Allenton, 15 June, 1880, *Geo. W. Letterman;* Tennessee, cedar barrens at La Vergne, 16 May, 1882, *Gattinger.*

Var. leiocarpum, Torr. & Gray. Stem and leaves nearly glabrous: fruit smooth and glabrous. — Torr. & Gray, Fl. ii. 20; Gray, Syn. Fl. N. A. i. pt. 2, 36. — Texas, *Drummond*, no. 113, *E. Hall*, no. 273, *Wright* (without number), also a specimen of Nuttall's collection bearing the datum "Red River."

§ 2. Fruit hirsute with long and straight (not uncinate-tipped) bristles.

* Leaves linear or linear-oblong (in *G. Wrightii*, var. *latifolium*, often somewhat elliptic or oblong-oblanceolate), 1-nerved.

+ Flowers axillary, solitary or in pairs, subsessile.

12. G. oresbium. Perennial: stems from a woody base, somewhat cespitose, 1 to 2 dm. high, below often naked and glabrate, numerously branched, leafy and pilose-hirsute above: leaves in fours, linear or linear-oblong, 2 to 4 mm. long, 1 mm. or less in breadth, acutish, hirsute-pubescent, margin revolute, midrib much thickened and prominent beneath, bearing on the under surface near the apex a single large gland: corolla about 2.5 mm. in diameter, 4-parted; lobes oblong-ovate, obtuse, externally pubescent. — Collected by *C. G. Pringle*, on dry mountain walls, Sierra de la Silla, Nuevo Leon, 16 July, 1889, no. 2542.

+ + Inflorescence cymose-paniculate: flowers distinctly pedicellate.

++ Dicœcious: flowers yellowish.

G. Fendleri, Gray. Stems several, erect or ascending, 1.5 to 3 dm. high, rising from a perennial base, glabrous or minutely and closely puberulent: leaves linear or linear-oblong, 0.5 to 1.5 cm. long, 1 to 3 mm. broad, acute or obtuse, glabrous or finely puberulent: flowers small: ovary bearing inconspicuous closely appressed hairs, these later spreading and becoming more prominent. — Pl. Fendl. 60, & Syn. Fl. N. A. i. pt. 2, 41. *G. Rothrockii*, Gray, Proc. Am. Acad. xvii. 203, in part (as to Rusby's plant). — New Mexico, *Fendler*, no. 288, White Mts., altitude 2300 m., *Wooton*, no. 287; Arizona, Mogollon Mts., *Rusby*, no. 155, Santa Rita Mts., 10 July, 1881, and 25 July, 1884, *Pringle*. Mt. Graham, *Rothrock*, no. 416, near Fort Huachuca, *Lemmon*, no. 2903.

++ ++ Flowers perfect or polygamo-monœcious, purplish.

13. G. Rothrockii, Gray. Stems several from a woody base, profusely branched, hirtellous-pubescent below and on the young shoots, glabrous above, rarely glabrous throughout: leaves linear, 0.5 to 1.5 cm. long, rather rigid, acute or short-acuminate, subpungent-tipped, glabrous or somewhat hirtellous: lobes of corolla acuminate: fruit rather sparingly hirsute. — Proc. Am. Acad. xvii. 203 (excluding Rusby's plant), & Syn. Fl. N. A. i. pt. 2, 39. — Arizona, *Rothrock*, no. 675, *Lemmon*, nos. 526, 3010, 2718; Lower California, *Orcutt*, no. 912; Sonora, *Wright*, no. 1113 in part; Chihuahua, *Pringle*, no. 661.

14. G. Wrightii, Gray. Hirsute-pubescent throughout: stems about 3 dm. high, rising from a woody base, profusely branched above: leaves linear to linear-oblong, 0.5 to 1.5 cm. long, 1 to 3 mm. broad, obtusish to mucronate-acuminate: corolla brownish purple; lobes mucronate-acuminate: fruit more densely hirsute than in the preceding species. — Pl. Wright. i. 80, ii. 67 in part, & Syn. Fl. N. A. i. pt. 2, 39. — Arizona, Apache Pass, *Lemmon*, no. 615, near Fort Huachuca, nos. 2902, 3011–2; New Mexico, *Wright*, nos. 421, 235 (type); Sonora, *Wright*, no. 1113 in part.

Var. latifolium, Rob. & Fern. Much less pubescent than in the species proper: leaves linear-oblong to elliptic-oblong, slightly narrowed toward the base, 0.5 to 1.5 cm. long, 1 to 5 mm. broad. — Proc. Am. Acad. xxx. 116. — Sonora, *Hartman*, no. 58.

* * Leaves linear-lanceolate to ovate-acuminate, lateral nerves absent.

15. G. stellatum, Kellogg. Suffruticose, 2 to 6 dm. high: stems covered with a light gray or yellowish bark; branchlets hirtellous or hispidulous: leaves rather rigid, 0.5 to 1.5 cm. long, 1 to 5 mm. broad, usually attenuate-acuminate, sometimes ovate, merely acute: flowers white: fruit densely pilose-hirsute; hairs in length exceeding the diameter of the fruit. — Proc. Cal. Acad. ii. 97, f. 26; Gray, Syn. Fl. N. A. i. pt. 2, 40. *G. acutissimum*, Gray, Proc. Am. Acad. vii. 350, not of Eastwood, Proc. Cal. Acad. vi. 292 (1896). — "Between the Rio del Norte and New Mexico," *Dr. Newberry*; Southern Utah, Santa Clara, *Palmer*, no. 86; Arizona, Camp Grant, 27 April, 1867, *Palmer*, no. 105, rocky cañons of the Santa Catalina Mts., altitude 770 to 1085 m., 19 April, 1881, *Pringle*, Santa Cruz, *Parish*, no. 76, Wickenburg, *Palmer*, no. 616; Southern California, *Parish*, nos. 1724, 2381, Colorado Desert, San Diego Co., *Orcutt* (without number), Panamint Mountains, *Coville & Funston*, no. 715; Lower California, Los Angeles Bay, Gulf of California, November, 1887, *Palmer*, nos. 525, 525½, 526.

* * * Leaves elliptic to oblong-ovate, usually 3-nerved from the base, bearing a single large gland or cluster of glands on the lower surface at the tip.

+ Leaves distinctly 3-nerved, margins strongly revolute.

16. G. hypadenium, SCHAUER. Suffrutescent: stems prostrate or ascending, glabrescent, often leafless and little branched below, covered with a thin grayish bark which later separates from the stem, freely branching above; branches tetragonal, pilose-hirsute: leaves sessile, 4 to 10 mm. or more long, nearly one half as broad, obtuse, usually hirsute-pubescent, more or less glabrate above, rather densely white-pilose or merely hirsute beneath, margins ciliate: corolla 4-parted, about 2 mm. in diameter; lobes externally pubescent with rather long hairs: fruit about 2 mm. in breadth; carpels somewhat separated at maturity. — Linnæa, xx. 700. *G. leucotrichum*, Hemsley, Biol. Cent.-Am. Bot. ii. 65, & v. t. xli. figg. 4–6. — Orizaba, *Müller*, nos. 174, 1218, *Sumichrast*, no. 514; Puebla, dry limestone ledges near Tehuacan, altitude 1540 m., 27 August, 1897, *Pringle*, no. 6694; Guerrero, between Chilopa and Tixtla, altitude 1540 to 2150 m., 17 December, 1894, *E. W. Nelson*, no. 2166; Jalisco, near Guadalajara, *Pringle*, 5046.

17. G. fuscum, MART. & GAL. Perennial: stems tetragonal, becoming more or less scabrous along the slightly thickened angles, the younger stems and branches bearing scattered pilose-hirtellous slightly curved hairs: leaves elliptic-oblong, 0.5 to 1.5 cm. long, 2 to 8 mm. broad, short-petiolate, submucronate or merely acute, glabrous or sparingly hirsute above and upon the nerves beneath, conspicuously glandular-punctate; margins usually ciliate: inflorescence cymose-paniculate: flowers brownish purple; lobes of corolla commonly pubescent. — Bull. Acad. Brux. xi. i. 126; Walp. Rep. vi. 13; Hemsley, Biol. Cent.-Am. Bot. ii. 64. — Oaxaca, Cerro de San Felipe, *Galeotti*, no. 2633, dry hills near the City of Oaxaca, altitude 1845 m., *Pringle*, no. 4795 (distributed as *G. uncinulatum*, DC., var. *abstipum*, Watson), near Reyes, altitude 1750 to 2000 m., *E. W. Nelson*, no. 1774; Guanajuato, *Dugès*.

+ + Leaves indistinctly 3-nerved, margins little or not at all revolute.

18. G. hystricocarpum. Stems usually many from a perennial base, ascending, more or less branched above, covered with a spreading pilose-hirsute pubescence: leaves elliptic-oblong to oblong-lanceolate, 5 to 12 mm. long, 2 to 7 mm. broad, short-acuminate or submucronate, hirsute on the upper surface and upon the midrib and inconspicuous lateral nerves beneath: flowers white, somewhat cymose-paniculate or terminating the lateral branches in few-flowered cymes: lobes of the corolla covered externally with a few long pilose hairs. — Cool cliffs and

ledges on mountains near Chihuahua, 25 October, 1886, *Pringle*, no. 741, distributed as *G. uncinulatum*, DC., var. *obstipum*, Watson.

§ 3. Fruit smooth and glabrous, dry, subcarneous or distinctly baccate.

* Herbaceous, nearly or quite glabrous plants: leaves usually in fours, occasionally in fives, sixes, or in whorls of seven.

+ Leaves linear-oblong to spatulate-oblong, obtuse: fruit dry.

G. Brandegei, Gray. Low herbs: stems 0.5 to 1.5 dm. high, usually matted or cespitose-depressed, glabrous or minutely hispidulous on the angles: leaves 5 to 10 mm. long, 2 to 3 mm. broad, glabrous or slightly hispidulous on the margins and midrib beneath: flowers axillary, solitary or in pairs: pedicels in fruit usually less than 1 cm. in length. —Proc. Am. Acad. xii. 58, & Syn. Fl. N. A. i. pt. 2, 38. *G. Brandegeei*, Wiegand, Bull. Torr. Bot. Club, xxiv. 398. — New Mexico, Valley of the Rio Grande, *Brandegee* (type); extending northward, according to Wiegand, to Saskatchawan. No Mexican specimens of this species have been seen by the writer, although the plant very probably occurs along the northern boundary.

19. G. trifidum, L., var. subbiflorum, Wiegand. Stems weak, ascending, usually much branched, nearly glabrous: leaves 5 to 15 mm. long, about 2 mm. broad, obtuse or slightly rounded at the apex, slightly hispidulous on the margins. — Bull. Torr. Bot. Club, xxiv. 399. — Federal District, Valley of Mexico, *Pringle*, nos. 6785, 7208.

Very difficult of separation, and perhaps not distinct from *G. Claytoni*, Michx.

+ + Leaves (nearly 4 cm. in length) oblong or obovate, cuspidate or aristate: fruit subcarneous.

20. G. glaberrimum, Hemsl. Glabrous throughout, glaucous; branches striate: leaves in whorls of seven (or the uppermost opposite), sessile, membranous, cuneate: flowers minute, disposed in a loose cyme; pedicels slender: fruit naked, somewhat fleshy. — Diag. Pl. Nov. pars tertia, p. 53, & Biol. Cent.-Am. Bot. ii. 64. — Mexico, *Liebmann*, no. 220.

+ + + Leaves (1.5 cm. or less in length) linear-oblong to elliptic-oblong, cuspidate-acuminate: fruit subcarneous or distinctly baccate.

++ Inflorescence terminating the stems and branches in few-flowered cymes: fruit subcarneous.

21. G. Galeottianum, Walp. Perennial nearly glabrous throughout, slightly hispid on the stems below: stems slender, reclining or ascending, 3 to 15 dm. long: leaves in fours, linear-oblong to oblong-

ovate, 5 to 10 mm. long, 1 to 4 mm. broad, acuminate, glabrous or slightly hispidulous on the margins, elongate-glandular-punctate beneath, and with a cluster of glands below near the tip: flowers brownish purple; lobes of the corolla cuspidate-attenuate. — Rep. vi. 17. *G. uropetalum*, Hemsley, Biol. Cent.-Am. Bot. ii. 66, & v. t. xli. f. 7–9. *Rubia acuminata*, Mart. & Gal. Bull. Acad. Brux. xi. 1, 127. — Southern Mexico, *Galeotti*, nos. 2631, 2632; Oaxaca, Sierra de San Felipe, altitude 3072 m., *Pringle*, no. 4710, vicinity of La Parada, altitude 2300 to 2700 m., *E. W. Nelson*, no. 1015.

++ Flowers axillary or mostly terminating the branches in pairs: fruit distinctly baccate.

22. G. Aschenbornii, Schauer. Perennial, many stemmed from the base: stems reclining or ascending, 3 to 5 dm. or more in length, glabrous or minutely hispidulous: leaves in fours, linear-oblong to elliptic-oblong, occasionally somewhat oblong-lanceolate, 0.5 to 1.5 cm. long, 2 to 5 mm. broad, acute, or cuspidate-acuminate, oblong-punctate beneath with a large gland or cluster of glands on the lower surface near the apex, glabrous or hispidulous on the margins: flowers at least in the dried state a greenish yellow; lobes of corolla cuspidate-acuminate: pedicels glabrous, in fruit 2 to 6 mm. in length: mature fruit about 5 mm. in breadth. — Linnæa, xx. 701. *G. geminiflorum*, Mart. & Gal. Bull. Acad. Brux. xi. 1, 126; Walp. Rep. vi. 17; Hemsley, Biol. Cent.-Am. Bot. ii. 64, & v. t. xli. f. 1–3. — Valley of San Luis Potosi, *Schaffner*, no. 841; Zimapan, *Th. Coulter*, no. 189; Jalisco, volcano of Colima, *Marcus E. Jones*, no. 218; Federal District, under pines, base of Sierra de Ajusco, altitude 2460 m., *Pringle*, no. 6597; Orizaba, *Müller*, no. 1444, *Galeotti*, no. 2604, and according to Hemsley, *Liebmann*, no. 236; Guatemala, *Donnell Smith*, no 1970, *Heyde & Lux*, no. 3975 (of Donnell Smith's sets), the latter distributed as *Relbunium hypocarpium*, Hemsl., and according to Hemsley, Biol. Cent.-Am. Bot. l. c., *Bernoulli*, no. 292.

* * More or less suffruticose plants, hirsute pubescent throughout: leaves in whorls of four to seven.

+ Stems 5–7-angled.

23. G. angulosum, Gray. Fruticose: stems 5–7-angled, covered below with a grayish bark; branches divaricately spreading, hirsute-pubescent especially on the angles: leaves in whorls of four to seven, linear-oblong or somewhat elliptic-oblong, 6 to 10 mm. long, 2 to 4 mm. broad, acute, slightly cuspidate-acuminate, hirsute-pubescent on the

upper surface and on the prominent midrib beneath, margins ciliate: flowers axillary or terminating the stems and short lateral branchlets: corolla glabrous, greenish white; lobes broadly oblong-ovate, acute: pedicels of the young fruit nearly 2 mm. in length, somewhat thickened, glabrous or sparingly hirsute: immature fruit glabrous, seemingly baccate. — Proc. Am. Acad. xi. 74, 115. — Guadalupe Island, off Lower California, *Palmer*, no. 36.

+ + Stems 4-angled.

24. G. pubens, Gray. A stout herbaceous perennial: stems apparently becoming somewhat indurated at the base: leaves in fours or rarely in fives, broadly ovate, ovate-oblong or oblong-linear, 5 to 15 mm. long, 2 to 8 mm. broad, acute or shortly subacuminate, hirsute-pubescent on either surface, the scattered hairs of the upper surface often curved or subuncinate, margins slightly hispid: flowers axillary or cymose: pedicels recurved, pubescent: immature fruit minutely pubescent, distinctly baccate: male plants more profusely flowered. — Proc. Am. Acad. vii. 350, Bot. Cal. i. 285, & Syn. Fl. N. A. i. pt. 2, 40. — California, *Bolander*, no. 6346, *Torrey*, no. 188; Lower California, near Encenada, 12 April, 1882, *Marcus E. Jones*, also from Lower California, collected by *Orcutt* in 1883, without number.

§ 4. Species of doubtful affinity.

25. G. ? denticulatum, Bartl. Stems diffusely branching, hispidulous-setose: leaves in fours, ovate, cuspidate, remotely dentate-ciliate, subhirsute upon either surface, 1-nerved: flowers few, terminating the stems, usually in threes: pedicels capillary: fruit glabrous? — In DC. Prod. iv. 612; Hemsley, Biol. Cent.-Am. Bot. ii. 64. — Mexico, Real del Monte, *Hænke*. Specimens not seen. Description compiled from De Candolle's Prodromus.

RELBUNIUM, Endl. (Name a Latinization of *relbun*, which Feuillée states to be the vernacular for a Chilian dye plant, the *Relbunium hypocarpium* of Hemsl.) — Flowers perfect, subtended by a 2–4-bracteate involucre. Calyx-tube globose; limb obsolete. Corolla rotate, 4-lobed; lobes valvate. Stamens 4, exserted, adnate to the tube of the corolla; filaments short; anthers dithecous. Ovary 2-celled; styles 2, free or connate at the base; stigmas capitate; ovules solitary in the cells, borne on the dissepiment, amphitropous. Fruit didymous, more or less fleshy or baccate, smooth and glabrous, or hirsute, usually two- or by absorption one-seeded. Seeds concave on the face: embryo curved; cotyledons foliaceous; radicle inferior. — Herbaceous perennials having

the habit, flowers, and foliage of *Galium*, but with the leaves in whorls of four, axillary inflorescence, involucrate flowers, and usually fleshy fruit. — Gen. Pl. 523 (as a section under *Galium*); Benth. & Hook. f. Gen. ii. 149; Schumann in Fl. Bras. vi. pt. 6, 103; Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 4, 154. *Galium* § *Relbunium*, Gray, Syn. Fl. N. A. i. pt. 2, 40, in part.

§ 1. Involucre of two bracts: fruit pedicellate.

1. R. sphagnophilum. A slender delicate annual, pale green, glabrous throughout: stems reclining, rooting at the nodes; internodes 2 to 12 mm. in length: leaves ovate-elliptic, 2 mm. long, one half to two thirds as broad, acute, narrowed below into a subpetiolate base: peduncles axillary, solitary, 2-bracteate above; bracts minute, less than 1 mm. in length: corolla not seen: fruit baccate, glabrous, about 1 mm. in breadth. — Collected by *C. G. Pringle* in sphagnum on the Sierra de Clavellinas, Oaxaca, altitude 2770 m., 17 October, 1894, no. 5812. Probably a near relative of the South American *R. humile*, Schumann.

§ 2. Involucre of four bracts: fruit sessile or nearly so.

* Leaves elliptic to obovate: plant hirsute-pubescent.

2. R. hypocarpium, Hemsl. Annual: stems 1 to 10 dm. long, pilose: leaves membranous, 5 to 15 mm. long, 3 to 8 mm. broad, rounded and usually obtusely mucronate at the apex, entire, ciliate, slightly narrowed at the base, pubescent upon either surface, dark green above, paler beneath: peduncles 5 to 15 mm. long: bracts of the foliaceous involucre ovate, acute or obtusish, narrowed into a subpetiolate base: flowers sessile; lobes of the corolla ovate, acutish, ciliate: fruit black or reddish, hirsute. — Biol. Cent.-Am. Bot. ii. 63. *R. hypocarpum*, Schum. Fl. Bras. vi. pt. 6, 112, t. 92. *Rubia hypocarpia*, DC. Prodr. iv. 591; *Valantia hypocarpia*, L. Syst. Nat. ed. 10, 1307. *V. hypocarpa*, L. Spec. ed. 2, ii. 1491. — Jalapa, *C. L. Smith*, no. 1570; Mirador, *Liebmann*, no. 225; Orizaba, *Müller*, nos. 1551, 1699, *Sumichrast*, no. 468; Oaxaca, *Pringle*, no. 5629; Guatemala, *von Türckheim* (no. 721 of Donnell Smith's sets).

* * Leaves ovate-oblong to oblong-lanceolate: plant glabrous.

3. R. lævigatum, Hemsl. Stems cespitose, diffusely branched: leaves ovate-oblong or ovate-lanceolate: peduncles axillary: flowers sessile and solitary in the involucre: fruit glabrous. — Biol. Cent.-Am. Bot. ii. 63. *Rubia lævigata*, DC. Prodr. iv. 591 (whence above description). *Galium lævigatum*, Bartl. in DC. Prodr. iv. 591. — Collected in Mexico by *Hænke*. Specimens not seen.

* * * Leaves lanceolate to lance-oblong, pubescent or at least ciliated; margins not conspicuously thickened.

4. R. hirsutum, SCHUMANN. Low prostrate many-stemmed herbaceous perennial; stems 4-angled, covered upon the somewhat thickened angles by a spreading hirsute pubescence: leaves lance-oblong, a centimeter or less in length, 2.5 to 3 mm. broad, hirsute-pubescent upon the upper surface and upon the midrib beneath, ciliate: the 1-flowered involucres solitary in the axils; their peduncles about equalling the leaves. — Fl. Bras. vi. pt. 6, 116. *Galium hirsutum*, Ruiz & Pavon, Fl. Peruv. i. 59.

The above description has been drawn from South American material, which well accords with the original characterization of the species by Ruiz and Pavon. No Mexican specimens have been seen by the writer. To this species, however, Martens and Galeotti in Bull. Acad. Brux. xi. pt. 1, 126, doubtfully refer *Galeotti's* no. 2650, collected on rocks near Mirador, Vera Cruz.

5. R. ciliatum, HEMSL. Low herbaceous plants: stems obtusely 4-angled, glabrous, leaves narrowly lanceolate, 1 cm. or less in length, acute, glabrous upon either surface, margin ciliate: peduncles axillary, solitary, slender, 3 to 5 mm. long; bracts of the involucre somewhat unequal, narrowly lanceolate, acute, ciliate: flowers sessile: fruit glabrous. — Biol. Cent.-Am. Bot. ii. 62. *Galium ciliatum*, Ruiz & Pav. Fl. Peruv. i. 59. *G. involucratum*, HBK. Nov. Gen. & Spec. iii. 335. *Rubia ciliata*, DC. iv. 591. — South Mexico in woods of El Sabino near the city of Mexico, *Galeotti*, no. 2596, acc. to Martens & Galeotti, Bull. Acad. Brux. xi. pt. 1, 126.

The typical plant is a native of Western South America. No Mexican or Central American specimens belonging to this species have been seen by the writer.

* * * * Leaves lance-linear to linear, more rigid; margins conspicuously thickened.

6. R. microphyllum, HEMSL. Glabrous throughout: stems rising from a perennial base, erect or nearly so, 1 to 3 dm. high, much branched above; branches obtusely 4-angled, faces somewhat furrowed: leaves 5 to 15 mm. long, usually pungent-tipped; margins revolute, thickened, smooth: peduncles axillary, solitary: bracts of the involucre similar to the leaves but smaller: flowers sessile; corolla-lobes ovate, obtusish: fruit glabrous or rarely slightly granulose, sessile or short-pedicellate. — Biol. Cent.-Am. Bot. ii. 63. *Galium microphyllum*, Gray, Pl. Wright. i. 80 & Syn. Fl. N. A. i. pt. 2, 41. — New Mexico, *Wright*, nos. 234,

420, 1111, Pinos Altos Mts., *Greene*, no. 145; Arizona, ravines about Camp Grant, 23 April, 1867, *Palmer*, no. 106, banks south of Camp Apache, *Rothrock*, no. 271, Santa Catalina Mts., and at Ft. Bowie, *Lemmon*, no. 127, also on Santa Catalina Mts., altitude 770 to 925 m., 17 April, 1881, *Pringle*, *Lemmon*, no. 527; Texas, El Paso, *Thurber*, nos. 179, 1118, at Belknap, *Sutton Hayes*, no. 327; N. W. Mexico, *Seemann* (without number); Sonora, about Hermosillo, *Crawford*, 1888; S. W. Chihuahua, August to November, 1885, *Palmer*, no. 413; Coahuila, Mts., 14.5 km. east of Saltillo, July, 1880, *Palmer* (without number); region of San Luis Potosi, *Schaffner*, no. 842 a, and at Soledad, 40 km. southwest of Monclova, September, 1880, *Palmer*, no. 415; Morelos, at Tres Marias near Cuernavaca, altitude 2920 m., *Pringle*, no. 7233. A species on the one hand, through var. *setulosum*, approaching the South American *R. ciliatum*, Hemsl., and on the other, through the var. *hispidulum*, the Mexican *R. polyplocum*, Hemsl.

Var. setulosum. Leaves setulose-ciliate: fruit granulose-hispid, otherwise like the species. — *R. microphyllum*, Hemsl. Biol. Cent.-Am. Bot. ii. 63, in part. — Zimapan, *Th. Coulter*, no. 186; region of San Luis Potosi, *Parry* & *Palmer*, nos. 309, 310.

Var. hispidulum. Habit of the species proper: stem and leaves covered with a scattered short hispidulous pubescence: fruit essentially glabrous, or somewhat granulose. — *R. polyplocum*, Hemsl. Biol. Cent.-Am. Bot. ii. 63, in part. — Valley of San Luis Potosi, *Schaffner*, no. 842; region of San Luis Potosi, altitude 1850 to 2460 m., *Parry* & *Palmer*, no. 308. Approaching the following species in the character of the pubescence, but having a distinctly different habit.

7. R. polyplocum, Hemsl. Herbaceous, closely hispidulous-pilose throughout: stems much branched forming dense mats; branches very slender, obtusely tetragonal as in the preceding species: leaves acute or obtusish, not distinctly cuspidate-tipped: flowers solitary, sessile in the small involucral bracts: fruit sessile or nearly so, small, white-granulose or glabrous. — Biol. Cent.-Am. Bot. ii. 63. — Southern Mexico. Mirador, *Liebmann*, no. 244, and (according to Hemsley) no. 243; also *Linden*, no. 516.

R. Aschenbornii, Hemsl. Biol. Cent.-Am. Bot. ii. 62, is *Galium Aschenbornii*, Schauer, treated above.

II. DIAGNOSES OF NEW AND CRITICAL MEXICAN PHANEROGAMS.

Tradescantia brachyphylla. Stems erect, 2 to 3 dm. high, branching from the base, glabrous except along a line ascending from the axil of each leaf: internodes 2 to 5 cm. long: leaves sessile, ovate-oblong, 1.5 to 2 cm. long, two thirds as broad, acute, glabrous on either surface, ciliate: flowers in sessile umbels terminating the stems and branches; pedicels about 1.5 cm. long, glabrous or with a scattered pubescence: sepals oblong, navicular, 6 mm. long, obtusish, glabrous or with a few hairs on the thickened keel: petals roseate, broadly ovate, obtuse, 6 to 7 mm. long, two thirds as broad: the alternating stamens longer and shorter respectively; filaments all bearded: ovary and style glabrous; stigma subcapitate: mature capsule 3 mm. long: seeds oblong, 1.5 mm. long, rugose; embryotega dorsal. — Collected by C. G. Pringle on dry limestone ledges near Tehuacan, altitude 1538 m., 29 July, 1897, no. 6679.

TRADESCANTIA HOLOSERICEA, Kunth, Enum. Pl. iv. 92. Specimens collected by Rev. Lucius C. Smith in the Clavellinas, State of Oaxaca, altitude 2770 m., 26 June, 1894, no. 66, and also by C. Conzatti and V. González on the Cerro de San Felipe, altitude 3000 m., 25 July, 1897, no. 229, but for the larger leaves agree in all essential details with Kunth's excellent description of the above species. The leaves in the specimens at hand are sessile, ovate-oblong, acuminate, 6 to 20 cm. long, 2.5 to 8.5 cm. broad. The flowers are violet or purple, and the bracts also are often more or less colored.

Tradescantia longifolia. *Dichorisandra longifolia*, Mart. & Gal. Bull. Acad. Brux. ix. 378 (reprint p. 7). Excellent specimens of this species from Southern Mexico, and agreeing well with the original description of Martens and Galeotti, prove to be quite distinct from *T. holosericea*, Kunth, under which species the plant under consideration has been placed as a variety. The following description may be appended: — roots fascicled, tuberous: stems erect or nearly so, 2 to 5 dm. high, simple or sparingly branched from near the base: leaves lance-attenuate, 10 to 15 cm. long, 1.5 to 3 cm. broad, villous-pubescent upon either surface, strongly ciliate, especially about the margin of the sheath: inflorescence an open oblong racemose panicle: flowers (in the dried state) 12 to 13 mm. in breadth: sepals oblong, 5 to 6 mm. long, rounded at the apex: the roseate petals obovate, slightly exceeding the calyx: stamens equal or nearly so; filaments strongly bearded: ovary glandular-

pubescent above: mature capsule 6 mm. long: seeds rugose. — Collected by Rev. Lucius C. Smith at Cuatro Venados, altitude 2150 m., 27 June, 1894, no. 64; by C. G. Pringle on hills above Oaxaca, altitude 1840 m., 6 August, 1894, no. 5608, and in the same locality, 15 July, 1897, no. 6711.

The species is readily distinguished from *T. holosericea*, Kunth, by the narrower long-attenuate leaves and by the roseate flowers.

Tradescantia macrophylla. Stems 4 to 6 dm. high, pubescent: leaves lance-attenuate, 15 to 25 cm. long, 3 to 4 cm. broad, pubescent upon either surface, ciliate; sheaths about 2 cm. long, somewhat inflated, veiny, more or less pubescent: inflorescence a terminal sparingly branched, villous-pubescent panicle, 8 to 22 cm. long; the lower divisions of the panicle 7 to 10 cm. long: flowers sessile or nearly so, in clusters of 3 to 5 flowers each: calyx glandular-pubescent: sepals navicular, oblong, nearly 5 mm. long, rounded at the apex, 3-nerved, margins scarious: petals equalling or slightly exceeding the calyx, white, streaked with brownish veins, or in the bud pale blue, marcescent: ovary glandular-pubescent above: capsule 5 mm. long: seeds rugose, 3 mm. long. — Collected by C. G. Pringle on bluffs of a barranca near Cuernavaca, 26 July, 1896, no. 7224, and in the same locality, altitude 1538 m., 21 August, 1897, no. 6695.

A well marked species, readily recognized by the long leaves, the close inflorescence, and the white or whitish flowers.

Anthericum platyphyllum. ? *Trachyandra echeandioides*, Schlecht. Bot. Zeit. iii. 629, not *A. echeandioides*, Bak. Roots fascicled, fleshy-fibrous, 1 to 2 dm. long: caudex erect, 1 dm. or more high, surrounded by a rather dense envelope of brownish fibres, the remnants of earlier leaves: leaves basal, narrowly lance-attenuate, 1.5 to 4 dm. long, 12 to 24 mm. broad, pale or livid green, glabrous on either surface with an inconspicuous semi-transparent hirtellous margin: peduncle about 4 dm. high, glabrous, terete, unibracteate, branching above into a racemose paniculate glabrous inflorescence, lateral branches of the panicle 3 dm. long: flowers 2 to 4 in the axils of short scarious bracts: pedicels 3 to 12 mm. long, much exceeding the bracts, glabrous, jointed just below the middle: perianth yellow, 2 cm. broad; divisions oblong, obtuse, 10 to 12 mm. long, 3-nerved, the inner slightly larger: stamens equal; filaments muricate; anthers oblong-linear, about 3 mm. long: capsule oblong, triangular, 1 cm. long, strongly reticulate-nerved: seeds angulate, black. — Collected by C. G. Pringle on dry limestone ledges near Tehuacan, altitude 1540 m., 29 July, 1897, no. 6680.

Zephyranthes Conzattii. Bulbs globose, 2 to 2.5 cm. in diameter, covered with dark brown scales; neck about 2 cm. long: leaves produced after the flowers: peduncle about 15 to 18 dm. long: spathes 2.5 to 3 cm. long, tubular below; valves lance-attenuate: pedicel slender, 3 to 4.5 cm. in length: perianth, in the dried state, rose-colored or crimson-purple in the bud, 5 to 7 cm. in length; tube short, 6 to 8 mm. long, with a lacerated ring in the throat; divisions oblanceolate, 1 to 1.5 cm. broad: stamens of two lengths, the alternating ones longer and shorter respectively, declinate; anthers strongly lunate: the declinate style exceeding the stamens; stigmas deeply 3-cleft; lobes revolute: fruit not seen. — Collected by Professor C. Conzatti, Valley of Oaxaca, altitude 1550 m., 19 April, 1896, no. 98.

A species in some respects corresponding to the description of the little known *Z. lilacina*, Liebm., but with pedicels much shorter than are attributed to that species.

Zephyranthes Nelsonii. Bulbs ovate, 1 to 2 cm. in diameter, covered with dark brown scales; neck 1.5 to 2.5 cm. long: leaves developed with the flowers, 5 to 15 cm. in length, 2 mm. or less wide, glabrous, obtuse: scape 5 to 12 cm. high: 1-flowered spathe 15 to 18 mm. long, scarious, often tinged with a pale rose color, tubular for about two thirds its length, bifid above, the divisions lance-attenuate: pedicel 12 to 20 mm. in length: perianth narrowly funnelform, white with a very slight tinge of rose, about 2.5 cm. high; tube slender, 6 to 7 mm. in length; divisions oblanceolate, 6 to 7 mm. broad, strongly nerved: stamens nearly equal, about two thirds as long as the perianth; anthers 4 to 5 mm. long: style overtopping the stamens; stigmas shortly 3-lobed: capsule about 5 mm. high, nearly twice as broad, glabrous. — Collected by E. W. Nelson, near Santa Domingo, Oaxaca, altitude 500 m., 18 June, 1895, no. 2711 a; also between San Ricardo and Ocozucuantla, Chiapas, altitude 800 to 1000 m., 18 August, 1895, no. 2983.

A species with much the habit of *Z. texana*, Herb., but with a much longer more pronounced perianth-tube, and less divided stigmas. Our plant may eventually prove to be the same as the *Z. Lindleyana*, Herb., but the flowers are somewhat smaller than are ascribed to that species in the original description, and certainly our plant does not well accord with the description of *Z. Lindleyana*, Herb., as drawn by Baker in his Handb. Amaryll. 32.

Cooperia Drummondi, Herb. acc. to Lindl., Bot. Reg. t. 1835. Specimens agreeing in all essential details with the above species were collected by the late Rev. Lucius C. Smith, at Peña de Ejutla, Nacalte-

pec, in the State of Oaxaca, altitude 2000 m., 1 June, 1895, no. 545; also by C. Conzatti near the city of Oaxaca, altitude 1550 m., 17 May, 1896, no. 146.

This species has been hitherto attributed to Northern Mexico and Texas.

FURCRÆA BEDINGHAUSII, Koch. Wochenschr. 1863, 233; Morr. Belg. Hort. xiii. 327, with fig.; Baker, Handb. Amaryll. 203, & Bot. Mag. t. 7170. To this species may be referred Pringle's no. 6669, collected on lava beds, Serrania de Ajusco, altitude 2600 m., 17 August, 1897, distributed as "Yucca Pringlei," a name given to the plant from fruiting specimens only. Early in the present season Mr. Pringle was successful in securing flowering specimens, which proved beyond a doubt that the affinity of the plant is with the genus *Furcræa*, and not with *Yucca*.

Through the kindness of Mr. J. G. Baker, of the Royal Gardens, Kew, Mr. Pringle's plant (notwithstanding its somewhat smaller leaves) has been identified with the above species.

Corallorhiza involuta. Aphyllous, glabrous throughout, the entire plant purplish: roots coralloid: stems 1 to 2.5 dm. high, provided with three sheathing obtuse bracts: racemes few–several-flowered: floral bracts short: perianth purple, about 12 mm. in diameter; sepals oblong, somewhat narrowed toward the apex, 6 mm. long, about one third as broad, 3-nerved, the lateral sepals a little unequal at their bases forming a slight gibbosity: petals oblong, obtuse, 3-nerved, nearly equalling the sepals: labellum deep purple with a yellowish base, oblong, thickened, 6 mm. long, about one half as broad with an obtuse blunt almost truncate apex, provided near the base with a thick cushion-like body, margins strongly involute: clinandrium somewhat arched, about 3 mm. long. — Collected by C. G. Pringle under oaks on the summit of Sierra de San Felipe, Oxaca, altitude 2925 m., 16 June, 1894, no. 5874.

This may possibly prove to be the same as the *C. bulbosa*, Rich. & Gal., but the base of the plant is not bulbous, and there is no correspondence with the character "hinc et illinc lobulo obtuso aucto."

CORALLORHIZA MEXICANA, Lindl. Gen. & Sp. Orch. 534. Specimens collected by Mr. C. G. Pringle on the Sierra de San Felipe, Oaxaca, altitude 2750–3000 m., June, 1894, no. 4690, also in the same locality by C. Conzatti and V. González, 12 September, 1897, no. 461, are referred doubtfully to the above species. In view of the very meagre descriptions of the Mexican species of this genus, it seems advisable to append the following description of the specimens in question.

Plant glabrous throughout, aphyllous: stems from an ascending rhizome, 3 to 7 dm. high, purplish, provided with 2 to 4 sheathing obtuse or acutish somewhat scarious nerved bracts: racemes many-flowered; rhachis subangulate; floral bracts small, scarious: perianth 1.5 cm. broad, yellowish white or purplish in the dried state, pedicellate, at first erect, later reflexed; the persistent sepals about 7 mm. long, nearly 3 mm. broad, obtuse, 3-nerved, the upper oblong the lateral oblong-lanceolate, slightly oblique, prolonged at the base into a short gibbous adnate spur; petals oblong, obtuse, often somewhat oblique, 3-nerved, a little shorter than the sepals; labellum 6 to 7 mm. long, yellowish white, dotted with purple, short-unguiculate, 3-lobed, 3-nerved from the base, lateral lobes short, somewhat falcate, obtuse, rounded or sometimes emarginate, the median lobe obovate-cuneate, subtruncate or retuse, entire, occasionally irregularly crenate, bilamellate at the base on either side of the midnerve, between the lateral sinuses, rather densely papillate on the upper surface, 5-nerved from the branching of the two lateral nerves just above the sinus on either side: clinandrium somewhat arched, about 5 mm. long: capsule oblong-obovoid, 12 to 17 mm. long, reflexed. A species as stated by Lindley "very like *C. multiflora*," but differing in the lobing of the lip, the papillate character, and the venation of the same, as well as the shorter lamellæ.

Corallorhiza Pringlei. Glabrous throughout, aphyllous: stems slender, 1 to 3.5 dm. high, more or less scaly-bulbous at the base; caudex provided with 1 to 3 sheathing bracts: racemes rather few-flowered; floral bracts minute, shorter than the pedicels, the latter 2 to 3 mm. in length: flowers small, 5 to 8 mm. in breadth when fully expanded; sepals oblong-lanceolate, obtuse, inconspicuously 3-nerved, 3 to 4 mm. long, about 1 mm. broad, exceeding in length the obtuse slightly broader lateral petals, both sepals and lateral petals marked with a semi-translucent oblong punctation; lip white variegated with purple, ovate-rotund or sometimes slightly obovate-rotund, narrowed at the base into a short claw, strongly emarginate at the apex, with an irregular crenate margin, 3–5-nerved, bearing two somewhat diverging lamellæ about one third distant from the base; clinandrum short, thick, about 2 mm. long: capsule oblong-elliptic, 7 mm. long, reflexed on slender pedicels. — Collected by C. G. Pringle on shaded banks, Las Sedas, Oaxaca, altitude 2000 m., 1 November, 1894, no. 5804; and on the Sierra de San Felipe, altitude 2600 m., 13 December, 1895, no. 6295.

Distributed in 1895 as *C. Mexicana*, Lindl., from which it is distinguished by the more slender habit, smaller flowers, and by the well marked characters of the lip.

EPIDENDRUM ELEGANS, Rchb. f. in Walp. Ann. vi. 374. *Barkeria elegans*, Knowles & Wescott, Fl. Cab. ii. 7, t. 49. This rare and beautiful orchid has been rediscovered by Mr. Pringle on limestone ledges near Tehuacan, altitude 1540 m., 31 July, 1897, no. 6769.

The species is readily recognized by its upright leafy stem, terminal racemose inflorescence, long bracteate-sheathed peduncle, and finally by the beautiful lilac-purple flowers (3–5 cm. broad), and the oblong usually undivided lip, which is adnate to the base of the column for one fourth the length of the latter organ.

CELTIS MONOICA, Hemsl. Biol. Cent.-Am. Bot. iii. 139, v. t. 77. Excellent fruiting specimens of this species were collected by Mr. E. W. Nelson on Maria Madre Island of the Tres Marias group of islands, 3–25 May, 1897, no. 4236. The leaves in Mr. Nelson's specimens are more distinctly serrate than in the type, but they have exactly the same outline, venation, and pubescence. The following description of the fruiting characters may be appended: — pedicels axillary, solitary, ascending or erect, 1 cm. or less in length, appressed-puberulent: mature fruit oblong-ovate, 10 to 12 mm. long, 6 to 8 mm. thick, subtriangular, glabrous: the undivided styles persistent.

The above species is readily recognized on account of the distinctly pinnate venation of the leaves, while in most of the species of the genus the leaves are 3-nerved from the base.

Pouzolzia Pringlei. Shrub: stems and branches covered with a grayish brown bark, dotted with scattered lenticels; the branchlets pubescent: leaves oblong-ovate or elliptic-ovate, 1.5 to 4 cm. long, 10 to 18 mm. broad, obtuse or acute, entire, ciliate, 3-nerved from the cuneate or rounded base, pubescent above, densely white-tomentose beneath; petioles pubescent, 3 to 10 mm. long; stipules triangular-acuminate, about 3 mm. long, ciliate, 1-nerved, pubescent on the outer or lower surface: flowers monœcious, disposed in dense axillary clusters: staminate flowers, 3–4-merous: the short bidentate perianth of the fertile flowers much exceeded by the long prominent style; fruiting perianth ovate, short-acuminate, about 2 mm. long, pubescent, somewhat tuberculate-winged, completely enclosing the ovate acute smooth white shining akene. — Collected by C. G. Pringle in Tomellin Cañon, altitude 1230 m., 9 July, 1897, no. 6736.

A species somewhat resembling *P. nivea*, Watson, but with oblong leaves and shorter stipules.

Ruprechtia Pringlei. Shrub or small tree 4 to 6 m. high: stems and branches terete, smooth, covered with a grayish bark: leaves oblong-

ovate or slightly obovate, 4 to 7 cm. long, 2 to 3.5 cm. broad, abruptly acuminate to an obtusish apex, entire or somewhat repand, narrowed at the base to a short petiole, glabrous above except on the puberulent midrib, pubescent below, the midrib and veins prominent on the lower surface, nerves not strongly reticulated: petioles barely 3 mm. in length: ochræ about 2 mm. long, deciduous: fruiting calyx 2.5 cm. long; tube 4 mm. long; inner divisions of the calyx small, linear, acute: akene narrowly ovate-acuminate, glabrous below, above bearing a trace of pubescence on the acute angles, the lower portion triangularly 3-lobed with shallowly furrowed lobes and rather deeply sulcate faces. — Collected by C. G. Pringle in Tomellin Cañon, Oaxaca, altitude 925 m., 7 December, 1895, no. 7008.

A species in general aspect similar to *R. fusca*, Fern., but with differently outlined and less reticulately veined leaves, smaller fruiting calyx, and essentially glabrous akene.

Iresine discolor. Shrub: stems terete, covered with a grayish bark and often dotted with numerous lenticels, the ultimate branches finely tomentose, somewhat compressed at the nodes: leaves opposite, petiolate, ovate-lanceolate, elliptic-lanceolate, or sometimes ovate, acute, 1 to 5 cm. long, 5 to 20 mm. broad, usually strongly discolorous, finely pubescent or even tomentose and granulose above, densely soft-tomentose beneath, acute or obtusish at the apex, margin entire, narrowed at the base into a short pubescent petiole; petioles 3 to 6 mm. long: inflorescence of rather small panicles terminating the branches; the branches of the panicles bearing pedicelled spikelets with tomentose rhachises; bracts scarious, broadly 1-nerved, ovate, obtusish: flowers diœcious: staminate flowers about 2 mm. long; divisions of the calyx scarious, oblong-elliptic, obtuse; stamens united at the base into a short cup, the 5 staminodea two thirds as long as the filaments, hirtellous; the rudimentary ovary with sessile shortly 2-lobed stigmas: pistillate flowers about 2 mm. long; calyx divisions elliptic-lanceolate, acutish, distinctly 1-nerved, with scarious margins; ovary glabrous; styles short with 2 (to 3) long slender stigmas. — Collected by C. G. Pringle and C. Conzatti in Santa Catarina Cañon, altitude 1000 m., 4 July, 1897, Conzatti's no. 231; also by C. G. Pringle in Tomellin Cañon, altitude 1230 m., 4 July, 1897, no. 6713, and in the same locality, altitude 1000 m., 17 May, 1894, no. 5787. The latter number, although differing slightly in foliar characters, has the same floral structure, and is said by Mr. Pringle to be the same as no. 6713.

Batis maritima, L. Syst. Nat. ed. 10, 1176. This species, not

hitherto definitely known to occur in Mexico, has been collected by Mr. Nelson on Maria Magdalena Island of the Tres Marias group of islands, 26–28 May, 1897, no. 4327.

THELYPODIUM LONGIFOLIUM, Watson, Proc. Am. Acad. xvii. 321. To this species may be referred Pringle's no. 6548, from the Valley of Mexico, 30 September, 1896, distributed under *T. micranthum*, Watson, and later described by Professor Edward L. Greene, Pittonia, iii. 247, as *T. anisopetalum*.

ERYSIMUM MACRADENIUM, Gay, Erys. Nov. 8. Excellent specimens of this interesting species, both in flower and fruit, were collected by C. Conzatti and V. González on the summit of the Sierra de San Felipe, Oaxaca, 15 August and 26 September, 1897, no. 499. The species is well marked by the large placental glands, and by the long capsules (15 to 16 cm. in length).

Phyllanthus subcuneatus. Suffruticose, about 1 m. high, glabrous throughout: stems and branches covered with a grayish bark, the younger shoots reddish: leaves alternate, often subfascicled, petiolate, obovate, obovate-cuneate or distinctly cuneate, 3 to 10 mm. long, two thirds as broad, rounded, subtruncate or retuse at the apex, entire, somewhat paler beneath; petioles 1 to 1.5 mm. long; stipules minute, about 1 mm. in length: flowers axillary: staminate flowers about 3 mm. broad, short-pedicellate; pedicels 1 to 4 mm. long: calyx 6-parted; divisions oblong or oblong-ovate, rounded at the apex, 1-nerved, margins scarious: stamens monadelphous; anthers 3 at the top of the column; glands 6, distinct: pistillate flowers 3 to 4 mm. broad, on slender pedicels, 6 to 9 mm. long: calyx 6-parted; the divisions obovate, rounded or obtusish at the apex, green; the disk cupulate, 6-lobed: ovary glabrous; styles united at the base only, spreading; stigmas slightly 2-lobed: capsule about 3 mm. in diameter, slightly broader than long: seeds triangular, about 2 mm. long, with a reddish brown minutely roughened surface. — Collected by C. G. Pringle on limestone ledges near Tehuacan, altitude 1540 m., 29 July, 1897, no. 6753.

Argithamnia neo-mexicana, Müll. Arg., var. depressa. Stems numerous, prostrate from a woody perennial base: leaves oblanceolate, 2.5 to 4 cm. long, about 8 mm. broad, narrowed below into a subpetiolate base, glabrate: calyx-divisions of the fertile flowers a little shorter and somewhat less acuminate than in the type: seeds conforming to the species proper. — Collected by C. G. Pringle on calcareous plains of Tehuacan, altitude 1540 m., 29 July, 1897, no. 6752.

EUPHORBIA LACERA, Boiss. Euph. Cent. 22, & Euph. Ic. t. 30. A

number of specimens of this species at hand show the foliage to be extremely variable. The leaves are ovate, elliptic-oblong to linear, 2 to 12 cm. long, 2 to 18 mm. broad, deeply incised-dentate (especially toward the base) to entire, usually with one or two larger divaricate triangular teeth at the base of the blade, which give the leaves a halberd-shaped appearance. The bicornute greenish appendages of the four glands of the involucre and the tetragonal seeds associated with the dichotomously branching glabrous stems, notwithstanding the strongly polymorphous character of the leaves, readily distinguish this species from *E. heterophylla*, L., with which it has been confused. The following specimens may be referred to *E. lacera:* Valley of San Luis Potosi, Schaffner, no. 859 (in the Gray Herbarium under *E. heterophylla*, L., var.); Sierra de San Felipe, Oaxaca, altitude 2300 m., 11 September, 1894, Pringle, no. 5619; at El Parin, Oaxaca, altitude 1230 m., 3 October, 1894, Pringle, no. 5707; also Pringle's no. 6685, collected on limestone hills near Tehuacan, altitude 2000 m., 30 August, 1897.

Euphorbia prostrata, Ait. Hort. Kew. ed. 1, ii. 139. To this species may be referred Pringle's no. 6436, *Euphorbia ramosa*, Seaton, var. *villosior*, Greenman, Proc. Am. Acad. xxxii. 297, also Pringle's no. 6683, collected on dry limestone ledges, Tehuacan, altitude 1540 m., 27 August, 1897; both specimens correspond well with Parry and Palmer's no. 818, Karwinski's specimen from Mexico without further data, and also with other authentic material.

The *E. ramosa*, Seaton (Proc. Am. Acad. xxviii. 121), is very closely allied to, if not specifically the same as *E. prostrata*, Ait., differing only in the glabrous capsules, and the less villous character of stem and leaves. The mature seeds in all the specimens mentioned above are grayish, subquadrangular, somewhat furrowed, more or less transversely rugose, and distinctly foveolate or honeycombed. The less mature seeds are more apt to be reddish, and more distinctly furrowed.

Euphorbia (Alectoroctonum) tricolor. Suffruticose, 1 m. or less in height: stems and branches covered with a grayish red bark, somewhat striated, puberulent on the young shoots; nodes 1 to 6 cm. distant: leaves petiolate, ternate, quaternate, or the uppermost opposite, oblong-ovate, 1 to 2 cm. long, two thirds as broad, glabrous above, sparingly pubescent beneath, rounded at the apex, entire, cuneate at the base; petioles pubescent, 4 to 8 mm. long; stipules glandular: inflorescence in terminal usually close cymes: involucre wine-colored or sometimes greenish, strigillose-pubescent on the outer surface, also pubescent within; lobes laciniate; glands subbilabiate, bearing oblong-ovate entire

or slightly toothed showy appendages, these on the outer surfaces at the base a deep wine color, above which is an area of purple or deep rose color, and this again tipped with white: ovary rather long-stiped, glabrous; styles bifid, about three fourths free, somewhat thickened: capsule obtusely triangular, 6 mm. long, 5 to 6 mm. in diameter: seeds ecarunculate, tetragonal, slightly roughened, 4 mm. long. — Collected by C. G. Pringle on dry calcareous bluffs near Tehuacan, 29 August, 1897, no. 6682.

Euphorbia (Cyttarospermum) violacea. Perennial, dichotomously branched from the base, 1 to 3 dm. high: stems and branches more or less angled and striate, glabrous or with a few scattered hairs, hispidulous at the nodes: nodes from 1 to 7 cm. distant: upper leaves opposite, the lower alternate, narrowly oblong or oblong-lanceolate, 1 to 4.5 cm. long, 2 to 8 mm. broad, glabrous or nearly so above, scattered hirtellous-pubescent beneath, acutish, entire, hispidulous on the margins, narrowed or attenuate at the base into a rather broad thickish petiole; petioles 2 to 10 mm. long; stipules glandular: inflorescence in terminal pedunculate cymes: bracts minute, pubescent: involucres turbinate, somewhat pubescent on the outside, greenish violet to almost black, with 5 oblong laciniate-truncate lobes, and 5 glands; glands oblong with oblong-rotund violet-colored white-margined appendages, 1 mm. or more in length: ovary long-stipitate, glabrous; styles 2-parted to the base: capsule obtusely triangular, 3 mm. in length, slightly broader than long; seeds ecarunculate, ovate, foveate, 2 mm. long. — Collected by C. G. Pringle on limestone hills near Tehuacan, altitude 2000 m., 30 August, 1897, no 6681.

A well marked species, readily recognized by the beautifully violet-colored involucre and glandular appendages.

Euphorbia xylopoda. Much branched from a woody perennial base, 2 to 9 dm. high, glabrous throughout: stems terete, subglaucous: cauline leaves alternate, the uppermost subverticellate, elliptic or oblanceolate, 1.5 to 4 cm. long, 5 to 12 mm. broad, acute or acutish, mucronate, entire, narrowed below to a short petiole, light green above, paler and almost glaucous beneath; petioles 2 to 5 mm. in length; stipules reduced to minute glands: involucres terminal, solitary, sessile, glabrous, 5-lobed, subtended by about three ovate or obovate short-acuminate much reduced more or less colored floral leaves, ciliated at the base; lobes broad, dentate-fimbriate; glands 5, oblong, sessile or nearly so, exappendiculate: ovary 3 mm. long, glabrous; style 3-parted; stigmas 2-lobed, fleshy: mature capsule depressed, obtusely triangular, about 7 mm. long,

8 mm. in diameter, glabrous: seeds oblong, 4 mm. long, smooth, carunculate. — Collected by C. G. Pringle on the hills of Las Sedas, Oaxaca, altitude 1850 m., 22 July, 1897, no. 6698.

A species belonging apparently to the section *Poinsettia* and having its affinity with *E. restiacea*, Benth., from which it is distinguished by the larger broader leaves, the broad lobes of the involucre, and by the presence of five glands.

Buxus pubescens. Shrub or small tree 4.5 to 8 m. high: stems and branches covered with a grayish bark; the branchlets and younger shoots provided with a soft spreading pubescence: leaves opposite or occasionally subalternate, sessile or nearly so, rhombic-ovate to oblong-ovate, 2 to 5 cm. long, 1.5 to nearly 3 cm. broad, 3-nerved, obtuse or acutish, mucronate, cuneate at the base, entire, ciliate, soft-pubescent beneath, more sparingly pubescent and glabrate above showing the reticulate venation on the upper surface: inflorescence of axillary short-pedunculate much contracted subracemose pubescent floral clusters: staminate flowers pedicellate; pedicels 3 mm. long, about twice exceeding the ovate acute bracts: calyx deeply 4-parted; divisions ovate, acute, 2 mm. long, the inner divisions slightly broader than the outer ones: the rudimentary pistil somewhat quaterfoil or X-shaped: fertile flowers about 5 mm. long, single, sessile, terminating the inflorescence; ovary glabrous: fruit not seen. — Collected on Maria Madre Island by E. W. Nelson, 3–25 May, 1897, no. 4221.

A species apparently endemic in the Tres Marias Islands, and most nearly related to the West Indian *B. pulchella*, Baill.

Metastelma macropoda. Stems twining, slender, terete, above as well as the branches decussately pubescent in two lines: leaves petiolate, elliptic-oblong to elliptic-lanceolate, 1.5 to 2.5 cm, long, 4 to 7 mm. broad, mucronate or simply acute at the apex, narrowed below to a rounded or obtusish base, glabrous on either surface, or slightly puberulent on the midrib above, margins ciliolate, usually revolute; petioles 2 to 4 mm. long, puberulent above, glabrous beneath: peduncles 3 to 18 mm. long, these as well as the pedicels minutely pubescent; pedicels 2 to 3 mm. long: flowers small: calyx-lobes ovate, obtuse, about 1 mm. long, margins scarious: corolla white or cream-colored, about 4 mm. in breadth; lobes elliptic-oblong, obtusish, rather closely pubescent above: column short: mature fruit not seen. — Collected by C. G. Pringle in Tomellin Cañon, altitude 1540 m., 17 July, 1897, no. 7606.

Most nearly related to *M. pedunculare*, Decne., but differing in the

foliar characters, smaller flowers, shorter claw, pubescence on the corolla-lobes, and also by having a shorter column.

Gonolobus caudatus, Gray, var. **trachyanthus.** Shrubby, 3 to 6 dm. high: leaves petiolate, lanceolate, attenuate, glabrous, 2.5 to 3.5 cm. long, 10 to 15 mm. broad: corolla distinctly puberulent above. — Collected by C. G. Pringle in Tomellin Cañon, altitude 600 m., 24 July, 1897, no. 6654.

Ipomœa dimorphophylla. Stems twining, purplish, more or less pubescent: leaves petiolate, ovate, 4 to 10 cm. long, 3 to 8 cm. broad, acuminate, subcordate, entire or deeply 3-lobed, lobes obtuse, mucronate, pubescent upon either surface especially on the prominent midrib, nerves, and veins beneath; petioles 2 to 5 cm. long, pubescent, often provided with two glandular organs at the base of the leaf-blade: inflorescence in axillary pedunculate 1–several-flowered cymes; peduncles green or greenish purple, 2 to 15 cm. in length, more or less pubescent; pedicels somewhat thickened, about 1 cm. long; bracts and bracteoles caducous: calyx-divisions oblong, 6 to 7 mm. long, nearly equal, the outer slightly shorter, rounded or retuse at the apex, dark brown or almost black with lighter scarious margins: corolla white, open-funnelform, about 6 cm. long: stamens included, one half as long as the corolla; filaments unequal, pilose at the base: style about equalling the stamens: mature capsule and seeds not seen. — Collected by C. G. Pringle in a barranca near Cuernavaca, 4 August, 1896, no. 7241, and in the same locality, altitude 1900 m., 23 August, 1897, no. 6658.

Ipomœa tentaculifera. Glabrous throughout: stems herbaceous, twining, somewhat angled: leaves cordate, entire, acuminate, mucronate, with an open sinus at the base and rounded basal lobes, 8 to 10 cm. long, 5 to 6 cm. broad: petioles 5 to 6 cm. long: peduncles 7 to 12 cm. long, 1-flowered: pedicels about 7 cm. long, much thickened: sepals nearly equal, oblong, 10 to 12 mm. long with a rounded apex and sub-scarious margins, the inner ones slightly longer, the outer covered with herbaceous tentacle-like outgrowths: corolla "violet throughout," open-funnelform, about 7 cm. long: stamens unequal, included, about one third the length of the corolla; filaments villous-pubescent at the base. — Collected by C. G. Pringle in Tomellin Cañon, altitude 1540 m., 17 July, 1897, no. 6702.

A beautiful and well marked species readily recognized by the one-flowered peduncles, the long almost fleshy pedicels, and by the peculiar tentacle-like growths on the calyx.

Cordia insularis. Shrub 3 to 5.5 m. high: stems and branches

glabrous, reddish brown, conspicuously dotted with numerous whitish lenticels; the extreme branchlets covered with a hirsute pubescence: leaves scattered, elliptic-ovate or sometimes slightly obovate, 1.5 to 3 cm. long, 1 to 1.5 cm. broad, narrowed below into a short petiole, obtuse, the upper portion more or less deeply crenate-dentate, occasionally sharply toothed, entire toward the base, hispid above, spreading hirsute-pubescent beneath, especially on the midrib and veins: inflorescence capitulate; heads small (after the corolla has fallen, about 5 mm. in diameter): peduncles, during anthesis, 1 cm. or less in length, covered with a spreading hirsute pubescence: calyx 2 mm. long, 5-dentate; teeth short, acute: corolla 3 mm. long, nearly cylindrical with short recurved lobes, externally glabrous, pubescent inside along the line of the filaments: stamens included: style a little exserted. — Collected by E. W. Nelson on Maria Madre Island of the Tres Marias group of islands, 3-25 May, 1897, no. 4296.

Most nearly related to *C. cana*, Mart. & Gal., from which it is distinguished by the more spreading pubescence throughout, the more coarsely dentate and shorter-petioled leaves, and further by the somewhat shorter peduncles.

Specimens collected by Mr. Pringle on lava beds near Zapotlan, State of Jalisco, 27 May, 1893, no. 4389, distributed as *C. cana*, Mart. & Gal., may be the same, although the pubescence on the young shoots, the peduncle, and the calyx is sub-appressed. The leaves in Mr. Pringle's plant are very much reduced, yet they have the spreading pubescence of *C. insularis* rather than of *C. incana*, so that it is difficult to say from the single specimen at hand to what species it may be correctly referred. Further material of Mr. Pringle's plant is necessary for positive determination.

Cordia Sonoræ, Rose, Contrib. U. S. Nat. Herb. i. 106. Specimens collected by E. W. Nelson on Maria Madre Island, 3–25 May, 1897, no. 4207, agree in all essential characters with the type of the above species. In Mr. Nelson's specimens, however, the leaves are nearly glabrous above, the stamens are included and the style is slightly exserted. As in the type specimen, collected by Palmer at Alaos in 1890, no. 376, the stamens are exserted and the style included, it is evident that the flowers of this species are dimorphic.

Heliotropium axillare. Low, cespitose, covered throughout with a stiff grayish white more or less closely appressed pubescence: stems spreading from a rather deep ligneous root: branches irregularly flattened or somewhat angled: leaves lanceolate or narrowly oblanceolate, 1 to 1.5

cm. long, 2 to 5 mm. broad, narrowed below into a short petiole, obtusish or acute at the apex, closely appressed-pubescent on either surface, margins revolute: flowers axillary, solitary, scattered along the branches from near the base: calyx-divisions lance-linear, acute, about 3 mm. long, slightly unequal: corolla when fully expanded, 8 to 10 mm. broad; tube about equalling the divisions of the calyx; lobes rounded: nutlets about 1 mm. long, slightly hirtellous on the outer upper surface. — Collected by C. G. Pringle on plains near Tehuacan, altitude 1540 m., 29 July, 1897, no. 6749.

Most nearly related to *H. Pringlei*, Rob., from which it is distinguished by the more closely appressed pubescence, the less unequal lobes of the calyx, and also by the more rounded lobes of the corolla.

Heliotropium mexicanum. Suffruticose: stems ascending or erect, 3 dm. or more high, usually much branched, covered below with a brownish pubescent bark, which gradually peels away from the stem, the stems above and also the branches covered with a rather dense reflexed pubescence, and with scattered ascending stiffer hairs intermixed: leaves alternate, short-petiolate, oblong-oblanceolate to narrowly lanceolate, including the petiole 1 to 5 cm. long, 2 to 8 mm. broad, the upper surface hirsute-hispid or sub-strigose with shorter finer hairs intermixed, somewhat channelled by the sunken midrib and lateral nerves, rather densely and finely pubescent beneath with scattered hirsute hairs intermixed especially upon the raised midrib and arched lateral nerves, obtuse or acute, margin entire, revolute: petioles about 1 mm. long: inflorescence in lateral and terminal usually pedunculate false racemes, either simple or in pairs, 2 to 20 cm. in length: flowers sessile or short pedicellate, bracteate: bracts small, subulate, about 2 mm. long: calyx 3 to 4 mm. long, deeply 5-parted; divisions somewhat unequal, linear-oblong, obtuse or occasionally acutish, hirsute-pubescent: corolla white, 5 to 6 mm. long, equally broad when fully expanded, shallowly 5-lobed or pentagonal, somewhat plaited, strigosely pubescent on the outer surface; tube slightly exceeding the calyx-lobes: stamens inserted at the middle of the corolla-tube: nutlets enclosed by the persistent calyx, about 1 mm. long, hirsute-pubescent. — Collected by Prof. A. Dugès near Guanajuato in 1880 (without number); Dr. Edward Palmer, Southwestern Chihuahua, August to November, 1885, nos. 31, 98; Rev. Lucius C. Smith at Cuicatlan, Oaxaca, altitude 554 m., 24 September, 1894, no. 209, and at Las Sedas, altitude 1780 m., 27 June, 1895, no. 391; C. Alvarez, Valley of Elta, Oaxaca, September, 1895 (L. C. Smith's collection), no. 750; Dr. Edward Palmer on Iron Mountain near the city of Durango.

June, 1897, no. 141 ; and by C. G. Pringle on hills near Oaxaca, altitude 1700 m., 2 July, 1897, no. 6726.

A species related to *H. fruticosum*, L., and to which some of the above cited specimens have been referred, but from which it is distinguished by the reflexed pubescence in the stems and branches, the two kinds of pubescence on the leaves, and finally by the shorter flowers and more obtuse calyx-divisions. From *H. rugosum*, Mart. & Gal., it may be distinguished by the pubescent fruit, and foliar characters. Through the kindness of M. Casimir DeCandolle, to whom I am very deeply grateful for many comparisons with type material, our plant was compared with *H. Oaxacanum*, DC., from which species it is amply distinct in the form of the leaves, pubescence, and calyx.

Ægiphila pacifica. Shrub 2.5 to 7 m. high: stems and branches terete, covered with a grayish brown bark and dotted here and there with lenticels, glabrous: branchlets terete, somewhat compressed at the nodes, fulvous-pubescent: leaves opposite, oblong-ovate, 5 to 15 cm. long, 3.5 to 7.5 cm. broad, more or less acuminate, entire, rounded or rather abruptly narrowed at the slightly unequal base, glabrous or at least glabrate above, with scattered tawny subappressed hairs beneath especially upon the midrib and veins: petioles less than 1 cm. in length: inflorescence terminating the stems and branches in rather close paniculate cymes; peduncles, pedicels, the subulate bracts and calyx covered by a fulvous subappressed pubescence: calyx about 4 mm. long, 4-lobed; lobes broader than long, submucronate, greenish: corolla tubular, 10 to 12 mm. long, glabrous; tube somewhat ampliated above; lobes oblong-elliptic, about 4 mm. long, obtuse: stamens equal or rarely unequal, exserted; filaments pubescent below, glabrous above: drupe yellow, obovoid, 8 to 10 mm. long, 6 to 8 mm. in diameter, one half or more exserted from the persistent coriaceous subcrenately lobed, cup-shaped calyx. — Collected by E. W. Nelson, on Maria Madre Island of the Tres Marias group of islands, 3–25 May, 1897, no. 4245 (in flower), and no. 4254 (in fruit).

A species related apparently to *Ægiphila brachiata*, Cham. & Schlecht., but Mr. Nelson's plant certainly does not accord with the description of this species as to the character of the pubescence and the color of the flowers.

Salvia aliena, Greene, Pittonia, i. 157. Excellent specimens of this very well marked species of *Salvia* were secured by Mr. E. W. Nelson on Maria Madre Island of the Tres Marias group of islands, 3–25 May, 1897, no. 4247. Mr. Nelson states that the plant is an herb from

9 to 12 dm. high. The closely and incisely toothed leaves, the rather small blue flowers, a little over 13 mm. in length, render this species readily recognizable.

SOLANUM MARGINATUM, L. f. Suppl. 147. Complete specimens agreeing in every detail with this interesting Old World species were collected by Mr. C. G. Pringle in the Valley of Mexico, 23 August, 1896, no. 7336, and at Coutreras, Valley of Mexico, altitude 2400 m., 14 August, 1897, no. 6667; also by Professor A. Dugès, in "Ravin (cañada) de Esperanza à 6 km. de Guanajuato" in the summer of 1897. The species is well illustrated in Jacq. Ic. Rar. t. 45.

Datura pruinosa. Herbaceous: stems, at least above, covered with a fine short close pubescence: leaves ovate or ovate-oblong, 3 to 8 cm. long, one half to two thirds as broad, repand-dentate, acute or obtusish at the apex, unequal at the base, puberulent on the upper surface, pruinose-pubescent beneath: petioles 1 to 4 cm. long, pubescent: flowers erect, pedicellate: pedicels during anthesis 4 to 8 mm. long, later becoming slightly elongated and reflexed: calyx tubular, 5-lobed, 3 to 4 cm. long, densely pubescent especially toward the base; lobes ovate-lanceolate, acute, somewhat unequal: corolla white, 5 to 6 cm. long, glabrous or nearly so; lobes tipped with a slender acumination: stamens included; filaments glabrous, adnate to the corolla-tube for one half its length: capsule pendulent on the reflexed pedicels, subglobose or slightly ovate-oblong, about 3 cm. long, armed with short slender prickles, these as well as the surface of the capsule finely pubescent: seeds oblique, light brown, pitted. — Collected by Rev. Lucius C. Smith, Cuicatlan, Oaxaca, altitude 550 m., 16 October, 1894, and 7 October, 1895, no. 943; also by C. G. Pringle, Valley of Oaxaca, altitude 1540 m., 8 July, 1897, no. 6732. A species readily recognized by the small flowers, and the fine close pruinose pubescence of the young leaves and the tips of the young branches. Most nearly related to *D. Metel*, L.

Distictis laxiflora. *Pithecoctenium laxiflorum*, DC. Prodr. ix. 195. Having at hand numerous and perfect specimens of the above species, it is evident, from the fruiting characters, that its affinity is with the genus *Distictis* rather than *Pithecoctenium*. To DeCandolle's excellent description, drawn, however, from a flowering specimen only, may be appended the following: — climbing: flowers, even in the same specimen, from 4 to nearly 10 cm. long, purple or violet: capsules ovate-oblong or lance-oblong, narrowed at either end, in the dried state 7 to 9 cm. long, about 4 cm. broad, often slightly curved, smooth, glabrate, longitudinally ridged along the midrib and margins of the valves, mar-

ginicidally septifragal, the valves falling away from the replum; seeds in several (4 or more) rows. — Collected by Professor A. Dugès, Guanajuato, 1893–1894, no. 111; Mrs. D. H. Sheldon, Lilos, Guanajuato, April, 1893, no. 52; Rev. Lucius C. Smith at Jayacatlan, Oaxaca, 3 June, 1894, no. 16, and at Monte Alban, altitude 1840 m., 26 July, and in November, 1894, no. 148; C. G. Pringle, Monte Alban, altitude 1780 m., 23 November, 1894, no. 5836, and in the same locality, July 1897, no. 6724; Rev. Lucius C. Smith, El Parin, Oaxaca, 15–17 June, 1895, and in October, 1894, no. 445; C. Conzatti and V. González, San Martin, Etla, Oaxaca, altitude 1800 m., 13 June and 8 August, 1897, no. 308. Said to be a "wonderfully beautiful climber with royal purple flowers."

Distictis cinerea. *Pithecoctenium cinereum*, DC. Prodr. ix. 195. Although only flowering specimens of this species are at haud, I have no hesitation in transferring it to the genus *Distictis* as its affinity is clearly with *D. laxiflora* and *D. gnaphalantha*. *D. cinerea* differs from *D. laxiflora* by the more ovate or oval character of the leaflets and the more dense cinereous pubescence on leaves and branches. — To this species may be referred specimens collected by E. W. Nelson near Tamazulapam, altitude 2000 to 2150 m., 16 November, 1894, no. 1958. M. Casimir DeCandolle has very kindly identified this as well as the preceding species with the types in the DeCandolle Herbarium at Geneva.

Distictis gnaphalantha, Benth. & Hook. f. Gen. ii. 1038. To this species may be referred specimens collected by Mr. Robert Combs at Calicita, Cuba, 31 May, 1895, no. 106, distributed under *Bignonia gnaphalantha*, Rich.

Dyschoriste quadrangularis, O. Kuntze, Rev. Gen. Pl. ii. 486. *Calophanes quadrangularis*, Oerst., Vidensk. Meddel. 1854, 120. It is interesting to note that this apparently rare plant has been collected at Las Canoas, State of San Luis Potosi, 29 August, 1891, Pringle, no. 5020. Mr. Pringle's plant hitherto having been confused with *D. bilabiatus*, O. Kuntze, l. c. (*Calophanes bilabiatus*, Seem.), from which species, however, it is readily distinguished by the smaller flowers, and by the absence of a glandular pubescence.

Beloperone comosa, Nees in DC. Prodr. xi. 416; Hemsl. Biol. Cent.-Am. Bot. ii. 516. *B. Pringlei*, Wats. Proc. Am. Acad. xxv. 160. The type of Dr. Watson's *B. Pringlei*, upon careful comparison with an authentic specimen of the above species collected at Monterey by Dr. Edwards, shows an exact correspondence in every regard, and it also

agrees well with the original description. It therefore seems best to regard *B. Pringlei*, Wats., as synonymous with *B. comosa*, Nees.

To this species also may be referred Dr. Coulter's no. 1193; and Pringle's plant, collected in Tamasopa Cañon, State of San Luis Potosi, 10 June, 1890, no. 3074, distributed as *B. Pringlei*, Wats.

Beloperone Nelsonii. Erect: stems branching, subterete, covered with a spreading or slightly reflexed grayish pubescence: leaves ovate-lanceolate or oblong-lanceolate, 5 to 10 cm. long, 2 to 4 cm. broad, obtuse at the apex, entire, narrowed below into a slender petiole, densely lineolate above, pubescent on either surface, especially on the veins, later becoming glabrous; petioles about 2 cm. in length: inflorescence terminating the stem and branches in rather close bracteate spikes: bracts oblong or obovate: bracteoles linear, nearly 1 cm. long, exceeding the calyx: calyx about 5 mm. long, deeply 5-parted; divisions nearly equal, lanceolate, acute, ciliate: corolla 2 to 2.5 cm. long; tube exceeding the limb; upper lip shortly 2-lobed, the lower more deeply 3-lobed, rather broad, somewhat plaited in the throat: capsule 10 to 12 mm. long, pubescent. — Collected by E. W. Nelson on Maria Madre Island of the Tres Marias group of islands, 3–25 May, 1897, no. 4246.

A species closely resembling *B. comosa*, Nees, but with a much shorter corolla, and broader lower lip. The leaves are also somewhat larger, longer petioled and much less pubescent. It may be that further material will prove this to be a variety of *B. comosa*, Nees, but, as the material at hand shows no sign of intergradation, it seems best for the present at least to regard Mr. Nelson's plant as a distinct species.

Portlandia pterosperma, Wats. Proc. Am. Acad. xxiv. 52. Excellent fruiting specimens were collected by Mr. E. W. Nelson on Maria Madre Island, 3–25 May, 1897, no. 4211, but for the slightly thicker leaves, correspond accurately with the type of the above species. Mr. Nelson's specimens show well the oblong-obovoid longitudinally ribbed and conspicuously lenticulated septicidally dehiscent (2.5 cm. long) capsule.

Machaonia floribunda. Shrub or small tree, 3 to 5 m. high: branches covered with a reddish brown bark, and dotted with numerous small lenticels: the ultimate branches finely pubescent: leaves petiolate, ovate to ovate-lanceolate, 2 to 5 cm. long, 1 to 2 cm. broad, acuminate, acute, entire, ciliate-scabrous, narrowed below into a pubescent petiole (2 to 5 mm. long), glabrous or puberulent on the upper surface, below glabrous except on the midrib toward the base: stipules (1 or 2) linear-subulate, 2 to 3 mm. long: inflorescence of compound many flowered

rather closely appressed-pubescent cymes: bracts and bractlets linear-subulate: flowers 4-merous: calyx-tube densely covered with a white appressed pubescence; lobes subequal, about 1 mm. long, obtuse, ciliate: corolla white, 3 mm. long, villous-pubescent on the throat and on the tube: fruit not seen. — Collected by C. G. Pringle on hills near Tampico, 16 June, 1897, no. 6641.

Lobelia tarsophora, Seaton in Mss. Stem erect, simple or branched at the base, 3 to 4.5 dm. high: leaves petiolate, membranaceous, ovate-lanceolate, acuminate, unequal and oblique at the base, undulate and mucronate-denticulate, nearly smooth, 5 to 7.5 cm. long, 2.5 cm. broad. racemes long, loosely flowered: bracts 2 mm. in length: pedicels 10 to 16 mm. long, spreading, becoming horizontal in fruit: corolla blue and white, 4 to 5 mm. in length, the lips unequal: calyx-tube becoming hemispherical in fruit, its rim and ribs persisting after the dehiscence and fall of the small globose half inferior capsule.— Collected by Henry E. Seaton on river banks near Cordoba, altitude 830 m., 20 August, 1891, no. 417. This species is well marked by its foliage, horizontal pedicels, and the peculiar persistence of the rim and nerves of the calyx-tube as a basket-like frame after the dehiscence of the capsule. In habit it most nearly resembles *L. novella*, Rob.

Zexmenia Pringlei. Perennial, stems striate, covered with an arachnoid pubescence: lower leaves opposite, the upper alternate, short-petiolate, ovate, 1.5 to 3 cm. long, two thirds as broad, obtuse at the apex, subcordate at the base, rugose and appressed-tuberculate-hispid above, densely tomentose beneath; petioles 4 to 7 mm. long, narrowly winged; heads including the rays 3 cm. broad, terminating the stem and branches, usually on long peduncles: involucre about 3-seriate; outer scales foliaceous, the inner straw-colored, oblong to oblong-lanceolate, about 1 cm. long, acutish, distinctly 1-nerved, glabrous or nearly so on either surface, long-ciliate on the erose margins toward the apex: pales lance-attenuate, about equalling the flowers, somewhat hirtellous on the distinct keel: ray-flowers 1-seriate, rather numerous (about eighteen); rays oblong, 12 mm. long, nearly one half as broad; akenes triangular becoming somewhat verrucose at maturity: disk-flowers about 1 cm. long; pappus bisetose with minute intermediate scales; mature akenes laterally compressed, with a narrow ciliated cartilaginous wing, glabrous or a little roughened, about 4 mm. long. — Collected by C. G. Pringle on limestone hills near Tehuacan, altitude 2000 m., 5 August, 1897, no. 6768.

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Presented by B. L. Robinson, March 8, 1899. Received March 15, 1899.

I. — ELEOCHARIS OVATA AND ITS AMERICAN ALLIES.

In attempting to place satisfactorily a number of strikingly different American plants, which, according to the standard works upon that group, must all be called *Eleocharis ovata*, a detailed study of the achenes has shown that our present conception of the species — especially in America — is remarkably indefinite. The commonest American plant passing as *Eleocharis ovata* is an annual species with many erect or ascending comparatively stout culms from 1 to 5 dm. high, capped by thick globose-ovoid or ovate-oblong obtuse densely flowered brown heads, 3 to 13 mm. long. The closely appressed ascending obovate-oblong or suborbicular scales are blunt, with scarious margins. The tubercle, usually as broad as the cuneate-obovate achene, is depressed, somewhat resembling in outline a high-crowned tam-o'-shanter cap; it is generally one third as high as the body of the achene. This common American plant (Figs. 1 to 7), now accepted as *E. ovata*, was described in 1809 by Willdenow as *Scirpus obtusus*, and it was subsequently transferred by Schultes to *Eleocharis*. For three fourths of a century the plant was generally treated by Torrey, Gray, and other recognized authorities on the group, as a distinct American species. In his monograph of the *Cyperaceæ*, however, Böckeler reduced[1] our common American *Eleocharis* (*Heleocharis*) *obtusa* to the well known *E. ovata* of central Europe. This disposition of the plant was accepted by Mr. C. B. Clarke in his study of the European species of *Eleocharis*,[2] and it has been adopted by subsequent American students of the group, — Britton, Watson, etc. Habitally the two plants are essentially alike, but a careful examination of achenes from an abundance of American and European specimens reveals certain differences which appear quite constant. The

[1] Böckeler, Linnæa, (1869–70), XXXVI. 463.

[2] Jour. Bot., XXV. 268.

achene of the European *E. ovata* (Figs. 9, 10) is obovate or inverted-pyriform in outline, and it is about three fourths as high and two thirds as broad as the obovate or cuneate-obovate achene of the typical American plant (Figs. 4 to 7) which commonly passes under that name. The tubercle of true *E. ovata* averages four sevenths as broad as the achene, while that of the American plant equals the achene in breadth. Though, as already stated, the European *E. ovata* and the American plant recently united with it are not readily distinguished by superficial characters, the apparently constant differences in their achenes and tubercles are sufficient to justify us in regarding our own plant as distinct from that of Europe, and in restoring to it the distinctive name *Eleocharis obtusa*, under which it was so long known to American botanists.

Although the common American plant, which, for the last three decades, has passed as *Eleocharis ovata*, proves on critical study to differ from that species in certain well marked and constant characters, the true *E. ovata* of Europe is not entirely wanting in our American flora. The American plant, however, which not only in habit but in the characters of achene and tubercle closely matches the European specimens and plates, is as yet known from only four northern stations, in New Brunswick, Maine, Vermont, and Michigan. In these specimens, in habit and achenes undoubtedly *E. ovata*, the oblong or ovate-oblong scales are very dark chestnut-brown or purplish, distinctly darker than is usual in *E. obtusa*.

In October, 1878, Mr. E. H. Hitchings collected in Dedham, Massachusetts (presumably in Purgatory Swamp), an *Eleocharis* which has proved unusually puzzling to those who have subsequently worked upon the genus. Two sheets of the plant, showing large and small specimens, are preserved in the Gray Herbarium, where they have been frequently shifted from one species cover to another. Originally Dr. Gray wrote upon one of the sheets, a "remarkable form, I think, of *Eleocharis intermedia*." Subsequently both sheets were referred by Dr. Watson to *E. obtusa*; but when studying the plants in the preparation of his synopsis of "The Genus Eleocharis in North America," [1] Dr. N. L. Britton referred the two Dedham sheets to different species, the smaller specimens to *E. olivacea*, the other to *E. palustris*. Why the two sheets should be thus separated we cannot make out. They are, to be sure, hardly identical in size, but in general habit, scales, and achenes they are the same,

[1] Jour. N. Y. Microsc. Soc., V. 95–111.

and they are both annuals with small tufts of merely fibrous roots. Both *Eleocharis palustris* and *E. olivacea*, on the other hand, are well known, and are always described as perennials with definite root-stocks. Another Massachusetts specimen, collected by C. E. Perkins at Winchester, soon after Mr. Hitchings found the puzzling Dedham plant, has likewise been referred to both *E. obtusa* and *E. olivacea*, and doubtfully to *E. diandra*. In attempting, then, to place satisfactorily this anomalous plant, recent botanists have associated it at different times with no less than five species.

The plant is probably of general, though perhaps not of abundant, distribution throughout eastern Massachusetts. In the middle of October, 1897, a small plant, which may well be a depauperate form of the Dedham plant, was collected by E. F. Williams and J. M. Greenman at Massapoag Pond in Sharon. Exceptional individuals among these autumnal specimens have short capillary stolons, but, except for this unusual development, they can hardly be distinguished from the smallest specimens collected by Mr. Hitchings. A little later, specimens identical with the larger Dedham plant were collected by Mr. Williams in the bog south of Annursnack Hill in Concord.

In northern Maine, on the upper waters of the St. John and Penobscot Rivers, where *Eleocharis palustris* and *E. intermedia* are common species, this Dedham plant is also abundant. There it has been carefully watched in the field, where it forms dense tufts of generally slender and decidedly flexuous culms, which are often quite prostrate upon the ground, giving the plant a superficial resemblance to *E. intermedia*. From the generally common *E. obtusa*, whose place this slender flexuous plant (Figs. 15 to 22) seems to take in northern Maine, it is otherwise superficially distinguished by its dark chestnut or purple ovate or ovate-lanceolate acutish scales, which are looser in the heads and more spreading than the paler brown ascending closely appressed obovate obovate-oblong or suborbicular blunt scales of *E. obtusa*. The color of the scales, though fairly constant, is not, however, so distinctive a character of the Dedham and northern Maine plant as the size and shape of the tubercle. The tubercle of this dark-scaled plant is deltoid-conical, slightly or not at all constricted at the base, suggesting in outline a half-closed parasol with incurved edge; it is about three fifths as wide as the obovate or inverted-pyriform achene which it caps, and usually about three sevenths as high as the body of the achene. The tubercle of *E. obtusa*, on the other hand, as already described, is usually as broad as the cuneate-obovate achene, and it is depressed and generally one third as high as the body of the achene.

The retrorsely barbed bristles of this species, too, are slightly coarser than in the other plant, though for distinguishing the species this character is less to be relied upon than those found in the scales and tubercles.

From *Eleocharis palustris* and *E. olivacea* this northern plant may generally be quickly separated by its annual habit, though, as noted in the Massapoag specimens, it very rarely produces late autumnal stolons. Its flexuous densely-clustered slender culms and its comparatively short ovate heads sufficiently distinguish it from the taller erect *E. palustris*, with its narrower elongated heads. In habit the plant strongly suggests *E. olivacea* (Figs. 23, 24), but in this latter perennial species the tubercle is narrower and lower, and of different outline: the sides, instead of being essentially straight, have a strong concave curve; and below, instead of rounding gradually to a slightly constricted base, the tubercle flares somewhat like a saucer.

Like *Eleocharis intermedia* and *E. diandra*, to which the northeastern plant has sometimes been referred, it is an annual. In habit it strongly suggests the former species, but that (Figs. 25, 26) has narrower spikes, and the more elongated achene is capped by a decidedly narrow deltoid conical tubercle reminding one of a very tall fool's cap. Nor is the plant satisfactorily referred to Charles Wright's obscure *E. diandra*. From such specimens as we know (the original material) that species (Figs. 53 to 58) seems to be of erect habit, and the narrower scales are pale brown with dark green midribs. The plant is unique in this group of annual species (excepting forms of the very different *Engelmanni* section) in its entire lack of bristles; and its smaller obovate achene is capped by a depressed tubercle about as broad and half as high as that of Mr. Hitchings's plant, but in outline resembling a miniature tubercle of *E. obtusa*. In short, the northeastern plant, which has been referred at various times to the five species here discussed, is as distinct from all of them as are they from one another, and the only other described plant which seems to approach it is a form of *E. ovata* of continental Europe.

Though *E. ovata* is an erect plant, and has been so described by most European botanists, a single sheet in the herbarium of Dr. Charles W. Swan shows an extreme form collected by Seidel at Reichenbach in Silesia, which is identical with the low flexuous-culmed plant first found in America by Mr. Hitchings. This depressed plant with flexuous culms hardly suggests to the casual observer the familiar erect *E. ovata*, but it is certainly difficult if not impossible to find in their achenes any satisfactory distinctions; and in northern Maine, at the single known station for the erect *E. ovata*, there are puzzling specimens clearly intermediate

between the two. This low form, more common in New England than the typical erect *E. ovata*, is doubtless the Silesian variety *Heuseri* of Uechtritz. From the description alone of Terracciano's var. *humifusa*, our plant may be the same as that Italian form. No specimens of the latter have been seen, and as the New England plant is clearly identical with the more northern var. *Heuseri*, Uechtritz, that name will here be taken up.

This flexuous dark-headed plant is not the only anomalous form long referred to *Eleocharis ovata*. A tall northwestern plant, 7 or 8 dm. high, has been considered by Mr. C. B. Clarke as a variety of this species. Aside from its unusual size, this plant is well characterized by the remarkable broadly obcordate tubercle (Figs. 11, 12), which is not at all compressed and fully half as high as the achene itself. Other northwestern plants, however, connect this extreme form directly with the typical *E. obtusa*, so that it seems undoubtedly an extreme variety of that species. Another striking form which an abundance of material shows to be in reality an extreme variation of *E. obtusa* is a slender somewhat depressed plant of the east. This plant (Figs. 13, 14), with capillary erect or generally decumbent or spreading culms mostly a decimeter or less (very rarely 2 dm.) high, is frequent in damp sand or in exsiccated places in New England and other eastern States. The short few-flowered heads are from 2 to 5 mm. long, and the oblong obtuse scales are slightly more spreading than in the true *E. obtusa*. The achenes, however, though a little smaller, are not distinguishable from those of that species, and occasional specimens occur which might equally well be referred to either form of the plant. For this reason, although the plant with capillary short culms seems habitually very distinct, it is here treated as a variety of *E. obtusa*. The smaller achenes of this low plant are about as high as those of the European *E. ovata*, but they are readily distinguished from that species by their greater breadth and by their tubercles.

Some other plants which have been associated in our herbaria with *Eleocharis ovata* apparently have less affinity with that species. *E. diandra*, Charles Wright (Figs. 53 to 58), has already been briefly discussed. Prior to publishing the species himself, Mr. Wright sent specimens to Dr. Gray who then considered the plant a "pretty good species," and gave it a provisional (though never published) name in the herbarium. In 1883 Mr. Wright described his plant, distinguishing it by a number of apparently constant characters from *E. obtusa*. In his "Genus Eleocharis in North America," however, Dr. Britton treated the plant as a probable form of the older species ("*ovata*"). In the subsequent edition of Gray's

Manual it is given only minor recognition, as a probable form of *E.* "*ovata*," and in the Illustrated Flora it is not even mentioned. Though the plant is as yet known only from a limited area in the Connecticut valley, its structural characters distinguish it from *E. ovata* and *E. obtusa* quite as clearly as do those of the now well recognized *E. Engelmanni*.

An Arkansas plant (Figs. 27 to 29) sent by Prof. F. L. Harvey to the late William Boott has been passing as a form of *E. obtusa*. In habit the plant resembles both that species and *E. diandra*, but its capillary culms are as fine as in the most slender specimens of the latter species. The heads, however, are not broad as in those species, but lanceolate and acute, 5 to 8 mm. long. The very pale ascending scales are lanceolate or oblong-lanceolate and acuminate. The achene, though not unlike that in the smallest form of *E. obtusa*, is shorter and broader than is usual in that plant, and the tubercle is hardly so depressed.

Another plant (Figs. 45 to 52) which has been included in the complex called *Eleocharis ovata* is a low but erect plant of the Northwest, occurring from the Cœur d'Alene valley southwestward through Oregon to the northern Sierra Nevada of California and extending eastward to the northern prairie region. The original specimens sent by Mrs. Pulsifer Ames from the Sierra Nevada in 1876 were referred by Dr. Gray to *E. palustris*, and subsequently by Dr. Watson to *E. obtusa*. Similar specimens, if not from the identical collection, were sent by Mr. Lemmon to William Boott, who pronounced them *E. obtusa*, as he did also a plant sent a year later by Mr. Howell from Multnomah Co., Oregon. Excellent material of essentially the same plant recently distributed by the National Herbarium from the Cœur d'Alene valley in Idaho is labelled *E. ovata*, as are also exceptionally large specimens collected by Professor Macoun in Manitoba. Though habitally somewhat suggesting the common *E. obtusa*, this northwestern annual plant has narrower looser-flowered acutish heads varying from ovate-lanceolate to oblong-lanceolate, and the narrower chestnut-tinged scales are acutish and more spreading. The achenes, though not unlike those of *E. obtusa*, are capped by more compressed tubercles resembling those of *E. Engelmanni*. The bristles, too, are like those of the latter species, about equalling the achene or much shorter, not exceeding it as in *E. obtusa*. In the shape of its spike and tubercle, then, and in its bristles, the northwestern plant is more like *E. Engelmanni* than *E. obtusa*. From that species it differs in its more ovoid head, and darker more acutish and spreading scales. *E. Engelmanni*, as ordinarily recognized, is a species of low altitudes, — primarily in the middle States, and rarely reaching the Atlantic seaboard.

For this reason, and in view of the slight though apparently constant habital and structural differences, it seems hardly justifiable to identify the Sierra Nevada and northern plant with the species of the central and southern prairie States.

Eleocharis Engelmanni (Figs. 30 to 40), which has been treated, now as a variety of *E. obtusa* (*ovata*), now as a distinct species, is generally given specific recognition. Resembling *E. obtusa* in habit, it is fairly characterized by its narrower elongated head, by its more compressed tubercle, and by its shorter bristles. It requires no detailed discussion here.

From these recent studies it seems that the American *Eleocharis obtusa* of Schultes is really distinct from the European *E. ovata* with which it has been united, but that, although rare with us in its typical form, the true *E. ovata* is represented in northeastern America principally by the little known Prussian (Silesian) var. *Heuseri*. And many annual plants, it seems, which have been associated with these species in our herbaria, though in some cases as closely related to *E. Engelmanni*, cannot be satisfactorily identified with either species. Nor are these plants more readily placed with the other species, *E. intermedia*, *E. palustris*, and *E. olivacea*, with which they have sometimes been associated. On this account they are here proposed, some as distinct specific types, others as extreme varieties of older species; and with the hope of diminishing the confusion which has so long existed among them, the following synopsis has been prepared of all the annual American forms (excluding the very distinct *E. intermedia*) here discussed.

In the preparation of this paper, besides the extensive collection of *Eleocharis* in the Gray Herbarium, and those in the Herbaria of the United States National Museum, the Canadian Geological Survey Department, Brown University, and the New England Botanical Club, the valuable sheets in many private herbaria have been placed at my disposal. To Messers. F. V. Coville, James M. Macoun, and J. Franklin Collins I am indebted for the use of material in their charge, and to the following gentlemen, whose private collections have largely supplemented the representation of species exhibited in the public Herbaria consulted: — President Ezra Brainerd, Judge J. R. Churchill, Drs. G. G. Kennedy and C. W. Swan, Rev. E. C. Smith, and Messrs. Walter Deane, E. L. Rand, W. P. Rich, and E. F. Williams.

Synopsis of Species.[1]

* Bristles overtopping the body of the achene.

+ Tubercle nearly or quite as broad as the achene.

++ Heads from globose-ovate to ovate-oblong: scales brown, obtuse.

E. obtusa, Schultes. — Figs. 1 to 7. — Culms generally many, comparatively stout, erect or ascending, 1 to 5 dm. high: heads globose-ovoid to ovate-oblong, obtuse, densely-flowered, 3 to 13 mm. long, 3 to 5 mm. broad: scales obovate, obovate-oblong, or suborbicular, ascending, close-appressed, dull brown or rarely chestnut-brown with pale scarious blunt or rounded margins and comparatively pale broad midribs: achenes mostly cuneate-obovate; tubercle depressed, about a third as high as the body of the achene. — Mant. ii. 89; Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 302; Gray, Man. 522; &c. *E.* (*Heleocharis*) *ovata*, Böckeler, Linnæa, xxxvi. 462, in part; C. B. Clarke, Jour. Bot. xxv. 268, in part; Wats. & Coulter in Gray, Man. ed. 6, 574; Britton, Jour. N. Y. Microsc. Soc. v. 102; Britton & Brown, Ill. Fl. i. 251, f. 584 (as to habital sketch); not R. Br. *Scirpus obtusus*, Willd. Enum. Hort. Berol. i. 76. *S. capitatus*, Walt. Fl. Car. 70; Pursh, Fl. i. 55; Ell. Sk. i. 77; Torr. Fl. N. & Midd. U. S. 45; and many other authors; not Willd. *S. oratus*, Muhl. Cat. 6; Pursh, Fl. i. 54; not Roth. *S. elegantulus*, Steud. Cyp. 317. — A common plant in muddy or wet places nearly throughout eastern North America, growing from Whycocozmah, Cape Breton (*Macoun*), Kent County, New Brunswick (*Fowler*), Piscataquis County, Maine (*Fernald*, no. 251), Ste. Clotilde, Quebec (*St. Cyr*), and Ottawa, Ontario (*Macoun*), to Minnesota (*Woods*, *Sandberg*, no. 669, *Taylor*), Iowa (*Butler*, *Fink*), and Kansas (*Norton*, no. 545) southward to the Gulf of Mexico. Reappearing in the northwestern United States and British Columbia: Green River Hot Springs, Washington (*Piper*, no. 6280); Clarke Co., Washington (*Suksdorf*, no. 2328); Pitt River, British Columbia (*Hill*). Some northern specimens not otherwise distinguishable from typical *E. obtusa* have castaneous scales.

Var. **jejuna**. — Figs. 13, 14. — Culms capillary, suberect or generally decumbent or spreading, 1 (rarely 2) dm. or less high: heads smaller, fewer-flowered, 2 to 5 mm. long: scales more spreading: achene

[1] The number and character of the stamens have sometimes been given prominence in distinguishing species of *Eleocharis*. When the achenes are well matured, however, the stamens are too often shrivelled or entirely gone, so that the differences found in them are hardly satisfactory criteria for determining species.

somewhat smaller, with the tubercle about three sevenths its height. — In damp sandy soil or exsiccated places, probably throughout the range of the species. MAINE, sandy intervale, Milo Junction, Sept. 12, 1896 (*M. L. Fernald*, no. 2838); river margin, Oldtown, Sept. 7, 1898 (*M. L. Fernald*, no. 2721); sandy shore, Orono, Sept. 7, 1893 (*M. L. Fernald*); damp sandy ground, North Berwick, Sept. 25, 1897 (*J. C. Parlin* & *M. L. Fernald*): NEW HAMPSHIRE, Mascoma River, Lebanon, Aug. 19, 1890 (*G. G. Kennedy*): VERMONT, Middlebury, Sept. 21, 1878 (*Ezra Brainerd*): MASSACHUSETTS, shore of North Reservoir, Winchester, Oct. 6, 1894 (*W. P. Rich*); Milton, Sept. 25, 1881 (*C. W. Swan*); Blue Hills, Sept. 29, 1894 (*W. H. Manning*); Great Pond, South Weymouth, Sept. 19, 1891 (*W. P. Rich*); without locality (*Morong*): RHODE ISLAND, South Kingston, Aug. 3, 1847 (*S. T. Olney*): ILLINOIS, Jackson Co., July 16, 1873 (*G. H. French*). Various specimens, as a sheet in the herbarium of the New England Botanical Club from Revere, Mass. (*Young*), a taller but slender small-headed plant from Framingham, Mass. (*E. C. Smith*), specimens from Harlan County, Kentucky (*Kearney*, no. 27), and from Indian Territory (*Bush*, nos. 632, 633), connect this variety directly with typical *E. obtusa*.

Var. **gigantea**. — Figs. 11, 12. — Culms stout and tall, 5 to 8 dm. high: heads ovate-oblong, 9 or 10 mm. long, 5 mm. broad: scales ovate, dark brown: achene as large as in the species, the broad obcordate tubercle not depressed, about five eighths as high as the achene. — *E. ovata*, var. *gigantea*, Clarke in Britton, Jour. N. Y. Microsc. Soc. v. 103 (*nomen nudum*). *E. obtusa*, Watson, Bot. Calif. ii. 222, in part, not Schultes. — Cascade Mts., "Oregon" (i. e. Washington), 49° N. Lat., 1859 (*Lyall*); bogs near New Westminster, British Columbia, Aug. 28, 1893 (*Macoun*, no. 7557). A low more slender and smaller-headed plant collected by Mr. Howell in Multnomah County, Oregon, July, 1877 (no. 409), and by Professor Macoun at Agassiz, British Columbia, May 20, 1889, has the smaller achene capped by a large tubercle, thus connecting this variety with the typical form of the species.

↔ ↔ Heads lanceolate: scales pale, acute.

E. lanceolata. — Figs. 27 to 29. — Culms slender, almost capillary, erect, 2 dm. high: heads 5 to 8 mm. long, 2 mm. broad, acutish: the hyaline green-ribbed scales subappressed: achene broadly obovate, with a scarcely depressed tubercle one half its height. — Collected in central Arkansas, July, 1882 (*F. L. Harvey*, no. 8).

+ + Tubercle distinctly narrower than the achene.

E. OVATA, R. Br. — Figs. 8 to 10. — Habitally resembling *E. obtusa*, the narrower but obtuse scales darker colored: the deltoid-conical often somewhat depressed tubercle about four sevenths as broad and about three sevenths as high as the body of the obovate or inverted-pyriform achene. — Prodr. Fl. N. Holl. 224 in adn.; Roemer & Schultes, Syst. ii. 152; Reichenb. Fl. Germ. Excurs. 77 (*Heleocharis*); Nees, Gen. Fl. Germ., ii. t. 18, f. 17–20; Ledeb. Fl. Ross. iv. 245 (*Elaeocharis*); Böckeler, Linnæa, xxxvi. 462 (as *Heleocharis*, excluding *H. obtusa*); Nyman, Consp. Fl. Europ. 766; C. B. Clarke, Jour. Bot. xxv. 268 (excluding *E. obtusa* and its syn.); Terracciano, Malpighia, ii. 310 (excluding *E. obtusa*); Richter, Enum. Pl. Europe, i. 143. *Scirpus capitatus*, Schreb. Spic. Fl. Lips. 60 (according to various European authors), not Willd. *S. ovatus*, Roth, Tent. Fl. Germ. ii. pt. 2, 562, & Cat. i. 5; Sturm, Fl. iii. Heft 10, with plate; Host. Gram. iii. 56; Fl. Dan. xi. t. 1801; Reichenb. Ic. Fl. Germ. viii. 37, t. 295, f. 700, 701; Anders. Cyp. Scand. 11, t. 2, f. 25. *S. compressus*, Moench, Meth. 349. *S. annuus*, Thuill. Fl. Bav. ed. 2, i. 22 (acc. to European authors). *S. nutans*, Bergeret, Fl. Pyren. i. 43 (acc. to European authors). *S. soloniensis*, Dubois, Meth. Orl. 249 (acc. to European authors). *S. multicaulis*, Gmel. Fl. Badens, i. 96. *S. turgidus*, Pers. Syn. i. 66. *Bulbostylis ovata*, Steven, Mém. Soc. Imp. Nat. Mosc. v. 355. *Clavula ovata*, Dumort. Fl. Belg. 143. *Eleogenus ovatus*, Nees, Linnæa, ix. 294. — The common form of the species in central Europe. In America definitely known from only four stations: ditches and boggy ground, Campbellton, New Brunswick, Sept. 4, 1882 (*John Macoun*); shallow pool, Masardis, Maine, Sept. 10, 1897 (*M. L. Fernald*, no. 2837); Middlebury, Vermont, July 6, 1878 (*Ezra Brainerd*); muddy places with *E. obtusa*, Keweenaw County, Michigan, Aug., 1886 (*O. A. Farwell*, no. 547, in part). Probably of wider distribution in Canada and the northern States.

Var. HEUSERI, Uechtritz. — Figs. 15 to 22. — Culms very numerous, slender and flexuous, often recurved or prostrate, from 3 cm. to 3 dm. long, of very different lengths on the same individual: heads dark chestnut-brown or purplish; the acutish scales more spreading than in the species: tubercles generally less depressed. — Uechtritz in Garcke, Ill. Fl. Deutschl. Aufl. 17, 625. *E. olivacea*, Britton, Jour. N. Y. Microsc. Soc. v. 101, in part (as to Dedham plant), not Torr. — Common in wet or springy places or even in shallow water in northern Maine, apparently less abundant in eastern Massachusetts. Collected by the writer at the

following stations in MAINE: — St. Francis, Aug. 26, 1893, no. 2836; Masardis, where it passes to the species, Sept. 8, 1897, no. 2834; Island Falls, Aug. 28, 1897, no. 2835; Blanchard, Sept. 4, 1897, no. 2833; Great Works Meadow, Clifton, Sept. 22, 1898, no. 2772. MASSACHUSETTS, bog, south of Annursnack Hill, Concord, Oct. 24, 1897 (*E. F. Williams*); Winchester, Sept. 19, 1881 (*C. E. Perkins*); Dedham, Oct., 1878 (*E. H. Hitchings*); Sharon, Oct. 17, 1897 (*E. F. Williams & J. M. Greenman*). Also in Prussia (Lusatia & Silesia) where it is apparently rare.

*** * Bristles about equalling or shorter than the body of the achene, or obsolete or none.**

– Tubercle nearly or quite as broad as the achene.

– Heads narrow-oblong or sub-cylindric; the blunt ascending scales close-appressed.

E. ENGELMANNI, Steud. — Figs. 37 to 40. — Habitally resembling *E. obtusa*, the comparatively slender culms 1.5 to 3 dm. high: heads brownish, 5 to 15 mm. long, 2 to 3 mm. broad, very rarely compound: achenes similar to those of *E. obtusa*, but the flatter tubercle only about one fourth the height of the body of the achene: the bristles about equalling the achene and retrorsely barbed. — Syn. pt. 2, 79; Britton, Bull. Torr. Club, xv. 100. *E. ovata*, var. *Engelmanni*, Britton, Jour. N. Y. Microsc. Soc. v. 103. — A little known species originally collected by *Dr. Engelmann* in marshy places in the hills west of St. Louis, Sept., 1845; Texas ? (Mex. Bound. Surv. no. 1527); and later found at Wethersfield, Connecticut (*Chas. Wright*), and on Pine Hill, Medford, Massachusetts, Aug. 19, 1880 (*C. W. Swan*). Better known in the

Var. DETONSA, Gray. — Figs. 30 to 36. — Generally a little stouter than the species: the bristles absent or represented only by their short naked bases. — Gray in Patterson, Cat. Pl. Ill. 46, & Bot. Gaz. iii. 81. *E. obtusa* β, Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 304. — MASSACHUSETTS, "Hills, Waltham" (*B. D. Greene*); Woburn, Oct., 1878 (*E. H. Hitchings, Thos. Morong*); shores of Winter Pond, Winchester (*W. Boott, E. H. Hitchings, C. W. Jenks & C. W. Swan* [a monstrous form with capitate proliferous clusters], *E. F. Williams*. &c.): PENNSYLVANIA, damp sandy ground, Tinicum, Delaware County (*A. H. Smith*): MICHIGAN, Detroit (*W. Boott*): INDIANA, borders of ponds, Lafonte (*E. J. Hill*): ILLINOIS, river bottoms, Oquawqua (*H. N. Patterson*): S. DAKOTA, Bangor (*Griffiths & Schlosser*): NEBRASKA, Fillmore Co. (*J. H. Wibbe*): INDIAN TERRITORY, border of pond, Fort Sill (*C. S. Sheldon*, no. 256): ARIZONA, Grand Cañon of the Colorado (*F. H.*

Knowlton, no. 231). A few specimens, cited by Dr. Britton under *E. Engelmanni*, I have not seen, but some of them may well belong to this variety, which is not recognized by him.

Var. **robusta.** — Figs. 41 to 44. — Culms stout, about 3 dm. high: the pale oblong-lanceolate heads becoming 2 cm. long, 3.5 or 4 mm. broad: achenes distinctly larger than in the other forms, the thicker tubercle less flattened, resembling that of *E. obtusa*, about one third as high as the achene: bristles as in the species. — Missouri, Montier, where it is said to be common, June 30, 1894 (*B. F. Bush*, no. 585); Springfield, 1889 (*J. W. Blankinship*); pond, Lawrence Co., June 19, 1890 (*W. J. Spillman*); ravines in the Ozarks, Shannon Co., July 6, 1890 (*B. F. Bush*, no. 42): essentially the same plant collected in western South Dakota, Sept., 1892 (*D. Griffiths*).

++ ++ Heads ovate-lanceolate to oblong-lanceolate; the acute or merely bluntish scales more spreading.

E. monticola. — Figs. 45 to 50. — Culms erect, 1 to 2.5 dm. high: heads 6 to 9 mm. long, 2 to 3.5 mm. broad: scales chestnut-brown or purplish with paler midribs and margins: achenes and tubercles resembling those of *E. Engelmanni*; the bristles equalling or slightly exceeding the achene. — *E. obtusa*, Watson, Bot. Calif. ii. 222 (as to Plumas County and Oregon plants), not Schultes. *E. ovata*, var. *Engelmanni*, Britton, Jour. N. Y. Microsc. Soc. v. 103, in part (as to *Lemmon* specimen). — Plumas County, California, 1876 (*Mrs. Mary E. Pulsifer Ames*); northern Sierra Nevada of California (*J. G. Lemmon*, no. 485); Multnomah County, Oregon (*Howell*, no. 408). Distinguished from the more eastern and southern *E. Engelmanni* principally by its more ovoid darker heads, and less appressed acutish scales, and like the latter species losing the elongated setulose portions of its bristles in

Var. **leviseta.** — Figs. 51, 52. — Bristles represented only by their short naked bases. — In muddy places, valley of Cœur d'Alene River, Kootenai County, Idaho, July 14, 1892 (*Sandberg, MacDougal & Heller*, no. 649); and in a muddy place west of Killarney, Manitoba, Aug. 1, 1896 (*John Macoun*, no. 16365).

+ + Tubercle distinctly narrower than the achene.

E. diandra, Chas. Wright. — Figs. 53 to 58. — Culms slender, erect, 2 or 3 dm. high: heads ovoid, obtuse or acutish, 4 to 6.5 mm. long, 2 to 3.5 mm. wide: the small pale brown ovate or oblong-ovate scales acutish or blunt, ascending but scarcely appressed: achenes small, broadly obovate or inverted pyriform, capped by a compressed tubercle resembling that

of *E. obtusa*, but only about five eighths as broad as the achene: bristles few and short, generally none. — Bull. Torr. Club, x. 101; Britton, Bull. Torr. Club, xv. 100 (under *E. Engelmanni*[1]); Britton, Jour. N. Y. Microsc. Soc. v. 102 (under *E. ovata*). — On high sand-bars of the Connecticut River, between Hartford and Wethersfield, Connecticut (*Chas. Wright*). A little known species; not satisfactorily referable, however, to either of the older forms with which some authors have placed it.

While studying the material associated with *Eleocharis ovata*, the annual plants passing as *E. intermedia* were also examined. This comparatively rare species is generally well understood, but a plant growing in marshes on the Gatineau River (a tributary of the Ottawa) has a very different achene, and it may well be distinguished, in recognition of its discoverer and his equally alert father, as

E. Macounii. — Fig. 26[a]. — Annual: culms slender, weak, the longest 2 or 2.5 dm. long: heads elliptic-lanceolate, about 1 cm. long, more densely flowered than in *E. intermedia* (Fig. 25), the ovate-lanceolate or oblong-lanceolate acutish or blunt scales dark brown: achene much compressed, obscurely triangular in cross-section, obovate, less elongated than that of *E. intermedia* (Fig. 26); the deltoid-conical tubercle nearly as broad and one half as high as the body of the achene. — Borders of marshes, North Wakefield, Quebec, Sept. 13, 1893 (*James M. Macoun*, no. 7552). In its elongated dark heads this Canadian plant more nearly resembles the European *E. carniolica* than the American *E. intermedia*. From them both, however, it is clearly distinguished by its more compressed obscurely angled achene, and its much broader tubercle.

[1] The reference here made by Dr. Britton to a note of Dr. Gray in Bot. Gaz. iii. 81, must have arisen through a misapprehension, for the only plants mentioned by Dr. Gray in the place cited are true *E. Engelmanni* and its var. *detonsa*.

II. — SCIRPUS ERIOPHORUM AND SOME RELATED FORMS.

In July, 1891, while collecting in the Saco valley about Cornish, Maine, I was puzzled by a strange "wool-grass" which there abounded in the low thickets and meadows. Eventually, however, the plant was consigned, with some other very different forms, to the one place provided for it in the American manuals — *Scirpus Eriophorum*, Michx. (*Eriophorum cyperinum*, L.). Again in 1896, my attention was called by Mr. J. C. Parlin to another "wool-grass" in southern Maine, which in size, color, and fruiting season was very unlike the common species of northern New England; and more recently Messrs. Luman Andrews and Chas. H. Bissell have made careful field-notes about Southington, Connecticut, on three very dissimilar plants, all of which we must call, if we adhere to the present treatment of the group, *Scirpus Eriophorum*. Two other forms, one from Maine and Massachusetts, the other from the southeastern and Gulf States, have been associated with this species, which, as now made up, includes six readily distinguished forms.

Linnæus described *Eriophorum cyperinum*[1] in 1762, basing it upon earlier descriptions of Rai,[2] Plukenet,[3] and Gronovius.[4] The Linnean species is a well known plant of eastern America, rather stout, the involucre ferruginous at base, and the small ovoid ferruginous spikelets clustered in glomerules. Uncommon in northern New England, it becomes abundant southward, extending at least to Kentucky.

In 1803, Michaux described as *Scirpus Eriophorum*[5] a southern plant (from Virginia to Georgia), and supposing it to be the same as the Linnean *Eriophorum cyperinum*, he transferred to it the latter species. Michaux's plant, however, though apparently an extreme form of the Linnean species, has the spikelets nearly all distinctly pedicelled, and it is a form of more southern range than the Linnean plant. During the present century these plants have been variously treated, as a single species or as varietally distinct, under *Scirpus* or *Eriophorum*, and by Persoon even as part of a separate genus, *Tricophorum*.[6] Ordinarily, Michaux's disposition of the plant as a *Scirpus* has been accepted, and, although the plant somewhat approaches species of *Eriophorum*, its

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[1] L. Spec. ed. 2, 77. [2] Rai, Suppl. 620. [3] Pluk. Mant. 62, t. 419, f. 3.
[4] Gronov. Virg. 11. [5] Michx. Fl. i. 33. [6] Pers. Syn. i. 69.

habit is that of many *Scirpi*, and it seems much better placed there than in the other genus.

As stated, the plants of Linnæus and his predecessors and of Michaux, both of which are probably extremes of a single species, are coarse plants most common from southern New England southward. The base of the involucre and the spikelets are ferruginous, and the long tangled bristles are also reddish brown, and in the fall, when the plants are mature, the ample inflorescences have the appearance of loose reddish brown masses of short wool. That this plant was clearly identified by American systematists early in this century is shown, not only by their descriptions, but by the English name "Red cotton-grass,"[1] sometimes employed by them.

Not until 1836, however, in Torrey's monograph of the *Cyperaceæ*, was the slender and uniformly smaller greenish-brown or drab "wool-grass," familiar to all botanists of New England and Canada, noted in botanical works; although from a manuscript note made by Dr. Gray while examining the Michaux herbarium, it seems that Michaux collected the smaller northern plant at Lake Mistassini, and that in the herbarium Lestiboudois had treated it as an undescribed species. In his monograph Torrey described the plant without a name as a variety of *Scirpus Eriophorum* (*S. Eriophorum* η[2]). Apparently the next reference to the plant is in the first edition of the Manual, where, under *Scirpus Eriophorum*, Dr. Gray says, "and northward are slender, less leafy forms, with much smaller umbels, and greenish-brown scattered small heads."[3]

The slender northern plant, with the involucre black below and with greenish black scales and dull brown or dark bristles, by all means the commonest "wool-grass" north of Boston, does not seem to have received much further attention. In subsequent discussions of the group it has been united with the now clearly identified ferruginous coarse plant of more southern range. The latter plant, the true *Scirpus Eriophorum*, Michaux, and its var. *cyperinus* (*Eriophorum cyperinum*, L.) are usually not mature until late August or September (the average date of collection, without regard to locality, of the specimens examined is September 1), while the slender northern plant, the *S. Eriophorum* η, Torrey, is generally mature in late June or in July (average date July 18), though its dead-ripe woolly umbels may remain in recognizable condition until

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[1] Bigel. Fl. Bost. 16.

[2] Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 331.

[3] Gray, Man. 528.

late fall. This striking difference between the fruiting seasons of the two plants, as well as the pronounced differences in size, aspect, and range, is sufficient evidence that the common drab "wool-grass" of our northern meadows and low thickets should no longer be confused with the more southern and coarser ferruginous species with which it has been so generally associated.

A very handsome plant, unlike anything which seems to have been formerly described, is found by Mr. Luman Andrews in Connecticut. The plant is apparently an extreme form of *Scirpus Eriophorum*, but unlike that species or its var. *cyperinus*, with short ovoid spikelets, this stout plant has the glomerulate oblong spikelets often 1 cm. in length. Occasional luxuriant specimens of *S. Eriophorum*, however, are found with the spikelets more elongated than in the type, thus connecting the Connecticut plant directly with that species.

The plants which have heen associated as *Scirpus Eriophorum* may be defined as follows.

* Culms stout (just below the involucre averaging 3 mm. in diameter), about 1.25 (rarely 1.5) m. high: leaves 4.5 to 11 (average 6) mm. wide: involucre usually ferruginous at base: scales and bristles ferruginous.

S. ERIOPHORUM, Michx. Inflorescence ample, 1.5 to 2.5 dm. high; the dichotomous rays of the umbel elongated and drooping at the tips: spikelets ovate or ovoid-oblong, 3.5 to 6 (average 4.5) mm. long, clustered at the tips of the branchlets, the lateral mostly on distinct generally elongated pedicels. — Fl. i. 33; Torr. Fl. N. and Middle States, i. 50, Ann. Lyc. Nat. Hist. N. Y. iii. 331 (including α & γ), & Fl. N. Y. ii. 356, in part; Kunth, Enum. ii. 170; Gray, Man. ed. 2, 501 (including var. *laxus*); Böckl. Linnæa, xxxvi. 731, in part. *S. eriophorus*, Vahl. Enum. ii. 282; Rœm. & Schultes, Syst. ii. 147. *S. thyrsiflorus*, Willd. Enum. Pl. Hort. Berol. 78. *S. cyperinus*, Kunth, var. *Eriophorum*, Britton, Trans. N. Y. Acad. Sci. xi. 82, in part; Britton & Brown, Ill. Fl. i. 271, in part. *Trichophorum cyperinum*, Ell. Sk. i. t. 3, f. 4, not Pers. *Eriophorum cyperinum*, L., var. *laxum*, Wats. & Coult. in Gray, Man. ed. 6, 582, in part. — Common in the southeastern and Gulf States, extending westward to Louisiana and north to Arkansas and New Jersey. Perhaps of more northern range, but as yet too little collected in condition mature enough for satisfactory identification. The following specimens are referred here: — NEW JERSEY, Woodbridge, Sept. 21, 1889, and Barnegat Bay, Aug. 25, 1892 (*J. R. Churchill*): VIRGINIA, Bedford Co., Sept. 1, 1871 (*A. H. Curtiss*); Northwest, Norfolk Co., Sept. 23, 1892, Sept. 6, 1893 (*A. A. Heller*, nos. 762, 1257): SOUTH CAROLINA, Aiken

(*H. W. Ravenel*): FLORIDA, Tallahassee, Aug. 12, 1895 (*Geo. V. Nash*, no. 2404); without locality (*Chapman*): GEORGIA (*Baldwin*): ALABAMA (*Drummond*): LOUISIANA (*Hale*): ARKANSAS, southern portion of State, July (*F. L. Harvey*, no. 17). Passing gradually to the northern

Var. CYPERINUS, Gray. Inflorescence ample, the rays stiffer and less pendulous than in the species; base of involucre less ferruginous; spikelets paler, sessile or subsessile in glomerules of 3 or more. — Man. ed. 2, 501. *S. Eriophorum* β, Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 331; Böckl. Linnæa, xxxvi. 732. *S. cyperinus*, Kunth. Enum. ii. 170; Britton, Trans. N. Y. Acad. Sci. xi. 82; Britton & Brown, Ill. Fl. i. 271, f. 636. *Eriophorum cyperinum*, L. Spec. ed. 2, 77; Bigel. Fl. Bost. 16; Wats. & Coult. in Gray, Man. ed. 6, 582. *Tricophorum cyperinum*, Pers. Syn. i. 69; Pursh, Fl. i. 57; Muhl. Gram. 47. — Of more northern range than the species, from Maine to Illinois and Kentucky. MAINE, Mattawamkeag Lake, Sept. 7, 1897 (*M. L. Fernald*); Fitts Pond, Clifton, Sept., 1898 (*M. L. Fernald*); Mt. Desert Island, Aug., Sept., 1889–91 (*E. L. Rand, J. H. Redfield*); North Berwick, Sept., 1896 (*J. C. Parlin*); Wells, July 29, 1886 (*W. Deane*): NEW HAMPSHIRE, Rye Beach, Aug. 29, 1886 (*W. Deane*): MASSACHUSETTS, East Gloucester, Aug., 1881 (*C. W. Swan*); Sherman's Pond, Waltham, Sept. 3, 1853 (*Wm. Boott*); Round Pond, Woburn, Aug. 16, 1868 (*Wm. Boott*); bog, Medford, Aug. 19, 1894 (*W. P. Rich*); Boston, Sept. 8, 1881 (*C. W. Swan*); Blue Hills, Aug. 15, 1894 (*W. H. Manning*): RHODE ISLAND, Providence (*S. T. Olney, Geo. Thurber*): CONNECTICUT, Southington, Aug. 13, 1896 (*C. H. Bissell*, no. 707), Sept. 11, 1898 (*Luman Andrews*, no. 432, in part): MICHIGAN, Alma, Aug. 24, 1893 (*C. A. Davis*): ILLINOIS, Mound City, Aug., 1862 (*Geo. Vasey*): KENTUCKY, Clear Creek, Bell Co., Sept., 1893 (*T. H. Kearney, Jr.*, no. 428).

Var. **condensatus.** Rays of the umbel shortened (only 6 cm. or less in length): glomerules of many spikelets short-peduncled or subsessile in a few dense masses 2 to 5 cm. in diameter. — *S. Eriophorum* ζ, Torr. l. c. 331? — Marshes, Hammond's Pond, Newton, Massachusetts, Aug. 23, 1854 (*Wm. Boott*); also at Seal Harbor, Mt. Desert Island, Maine, Sept. 4, 1891 (*J. H. Redfield*); Lynnfield, Mass., July 13, 1879 (*H. A. Young*); Everett, Mass., Aug. 6, 1892 (*W. P. Rich*).

Var. **Andrewsii.** Rays of umbel elongated and pendulous as in the species: spikelets oblong, 7 to 10 mm. long, mostly in glomerules of from 3 to 15. — Southington, Connecticut, Sept. 11, 1898 (*Luman Andrews*, no. 432, in part).

* * Culms more slender (averaging 1.5 mm. in diameter), about 8 (rarely 11) dm. high: leaves 2 to 5 (average 3.5) mm. wide: involucre black at base: scales greenish-black: bristles drab or olive-brown, not ferruginous.

S. atrocinctus. Inflorescence 0.5 to 1.5 dm. high; the dichotomous rays of the umbel slender, elongated and drooping at the tips: spikelets ovate to ovoid-oblong, 3 to 6 mm. long, scattered on slender pedicels, or in glomerules of from 3 to 6, the outer generally distinctly pedicelled. — *S. Eriophorum* η, Torr. l. c. 331. *S. Eriophorum*, Torr. Fl. N. Y. ii. 356; Gray, Man. 528; Böckl. Linnæa, xxxvi. 731; in part. *S. Eriophorum*, Michx., var. *laxus*, Gray, Man. ed. 2, 501, in part. *S. cyperinus*, Kunth, var. *Eriophorum*, Britton, Trans. N. Y. Acad. Sci. xi. 82; Britton & Brown, Ill. Fl. i. 271; in part. *Eriophorum cyperinum*, L., var. *laxum*, Wats. & Coult. in Gray, Man. ed. 6, 582, in part. — The common species of the northeastern States and Canada, from Prince Edward Island and Lake Mistassini to the Saskatchewan, south to Connecticut, western New York, and Iowa. Specimens examined: — PRINCE EDWARD ISLAND, Beackley Point, Aug. 24, 1888 (*John Macoun*): ONTARIO, Nipigon River, July 20, 1884 (*John Macoun*): MANITOBA, Lake Winnipeg Valley, 1857 (*E. Bourgeau*): SASKATCHEWAN, without more definite locality, 1858 (*E. Bourgeau*): MAINE, Fort Fairfield, 1881 (*Kate Furbish*); Orono, July 4, 1889 (*M. L. Fernald*); Northeast Harbor, July, 1883 (*E. L. Rand, R. W. Greenleaf*); Sargent Mt., Mt. Desert Island, Aug. 6, 1883 (*R. W. Greenleaf*); Long Pond Meadows and "The Cleft," Seal Harbor, July 28, Aug. 7, 1890 (*J. H. Redfield*); Bubble Pond, Mt. Desert Island, Aug. 13, 1890 (*J. H. Redfield*); Rumford, July 4, 1890 (*J. C. Parlin*); North Berwick, June, 1892 (*J. C. Parlin*); Wells, July 1, 1898 (*Kate Furbish*): NEW HAMPSHIRE, Crawford Notch, July 28, 1853 (*Wm. Boott*); Randolph, July 28, 1897 (*E. F. Williams*); Shelburne, Aug. 12, 1883 (*W. Deane*); Jackson, July 29, 1890 (*J. R. Churchill*); Tuckerman's Ravine, Mt. Washington, Aug. 28, 1889 (*J. R. Churchill*); East Jaffrey, July 19, 1897 (*B. L. Robinson*, no. 325): MASSACHUSETTS, Lynnfield, July 19, 1854 (*Wm. Boott*); Lowell, July 9, 1882 (*C. W. Swan*); Chelmsford, July 24, 1882 (*C. W. Swan*); Fresh Pond, Cambridge, June 15, 1853 (*Wm. Boott*); Boston, June 27, 1881 (*C. W. Swan*); Sharon, July 1, 1894 (*E. F. Williams*); summit, Greylock Mt., Aug. 4, 1898 (*J. R. Churchill*): RHODE ISLAND, Providence (*S. T. Olney*): CONNECTICUT, Southington, June 29, 1898 (*Luman Andrews*, no. 431), June 30, 1898 (*C. H. Bissell*, no. 706); NEW YORK, in the Lake region (*Asa Gray*): MICHIGAN, Keweenaw Co., Aug., 1890 (*O. A. Farwell*, no. 756); Round Island, Lake Superior, Aug. 2, 1875

(*Henry Gillman*, no. 12): Iowa, Clinton Co., July 1, 1878 (*Geo. D. Butler*). Passing to

Var. **brachypodus.** Spikelets subsessile or on shortened pedicels, in a capitate or subcapitate cluster 2 to 4 cm. in diameter; inflorescence occasionally with one or two elongated rays. — With the species, or more often by itself in wet meadows or swamps. Apparently the common form in Newfoundland. — Newfoundland, St. John's, Aug. 3, 1894 (*Robinson & Schrenk*, no. 65); without locality, 1835 (from Herb. J. Gay, collector unknown): Maine, Dead River, Aug. 13, 1896 (*M. L. Fernald & W. C. Strong*, no. 482); Hartford, July, 1892 (*J. C. Parlin*); Cornish, July 21, 1891 (*M. L. Fernald*); Wells, July 8, 1898 (*Kate Furbish*): New Hampshire, Randolph, July 10, 1894 (*E. F. Williams*); above the woods, Mt. Monadnock, Aug. 10, 1883 (*C. W. Swan*); Jaffrey, Aug. 3, 1890 (*W. Deane*); near East Jaffrey, July 9, 1897 (*B. L. Robinson*, no. 326): Vermont, Willoughby Lake, Aug. 3, 1885 (*W. Deane*): Massachusetts, Reading, July 12, 1882 (*C. E. Perkins*).

EXPLANATION OF PLATE.

Eleocharis obtusa: Fig. 1, small head; Figs. 2, 3, scales; Figs. 4, 5, 6, 7, achenes.
E. obtusa, var. *gigantea*: Figs. 11, 12, achenes.
E. obtusa, var. *jejuna*: Fig. 13, head; Fig. 14, achene.
E. ovata: Fig. 8, scale; Figs. 9, 10, achenes.
E. ovata, var. *Heuseri*: Fig. 15, head; Figs. 16, 17, 18, 19, 20, achenes; Figs. 21, 22, scales.
E. olivacea: Fig. 23, head; Fig. 24, achene.
E. intermedia: Fig. 25, head; Fig. 26, achene.
E. Macounii: Fig. 26^a, achene.
E. lanceolata: Fig. 27, head; Fig. 28, scale; Fig. 29, achene.
E. Engelmanni: Figs. 37, 38, 39, 40, achenes.
E. Engelmanni, var. *detonsa*: Fig. 30, head; Figs. 31, 32, 33, scales; Figs. 34, 35, 36, achenes.
E. Engelmanni, var. *robusta*: Fig. 41, head; Figs. 42, 43, 44, achenes.
E. monticola: Fig. 45, head; Figs. 46, 47, 48, scales; Figs. 49, 50, achenes.
E. monticola, var. *leviseta*: Figs. 51, 52, achenes.
E. diandra: Fig. 53, head; Figs. 54, 55, scales; Figs. 56, 57, 58, achenes.

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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY, NEW SERIES, No. XVI.

Presented by B. L. Robinson, March 8, 1899. Received March 15, 1899.

I.—REVISION OF THE GENERA MONTANOA, PERYMENIUM, AND ZALUZANIA.

By B. L. Robinson and J. M. Greenman.

No considerable collection of Mexican or tropical American plants has been received at the Gray Herbarium in recent years, which has failed to contain one or more new or otherwise exceptionally interesting *Compositæ* of the subtribe *Verbesineæ*. The repeatedly experienced difficulty of properly placing such plants — due on the one hand to the imperfect characterization of many of the earlier described species, and on the other to the somewhat vague generic lines — has suggested the revisions here presented. While by no means exhaustive treatments, they correlate the hitherto scattered results of considerable recent work on this group, and furnish, in the light of the fuller material now available, a new critique upon many of the earlier species. Of the genera here treated, *Montanoa* has long been the most difficult, largely by reason of the brief and obscure descriptions of many species, chiefly those of Schultz Bipontinus, a writer whose long and intensive study of the *Compositæ* led him to a far more critical discrimination than intelligible description of species. Probably no one in recent years has given more attention to the work of Schultz than the late Dr. F. W. Klatt, who examined many of his types, and, when unable to secure duplicate specimens, recorded his observations by excellent sketches and notes. The recent acquisition of the Klatt collection of *Compositæ* by the Gray Herbarium has rendered it possible to interpret many of these doubtful plants with greater precision than could heretofore be effected on this side of the Atlantic. Others, however, are still obscure, and must remain so until their types can be examined in scattered European herbaria. Even when this can be accomplished, it is a question with how much practicality or justice such species, many of which are merely *nomina subnuda*, can be revived to displace fully and carefully characterized

species of later date. At all events, it is highly inexpedient to permit the existence of imperfectly described plants to block the advance of classification in the groups concerned, and, while anxious to give proper recognition to all the more careful work of Schultz and others, we have no hesitation in frankly relegating their less intelligible species, for the present, to that limbo of *dubiæ* which must long be appended to several of the larger genera of the *Verbesineæ*.

In citing specimens, literature, and synonymy, the writers have aimed to supplement rather than to repeat what can be readily found in the Synoptical Flora, Biologia Centrali-Americana, Flora Brasiliensis, or Index Kewensis. Species of which no specimens have been seen during these revisions are marked by an asterisk (*). The writers are grateful to Mr. F. V. Coville and Dr. J. N. Rose for the loan of the genus *Montanoa* from the U. S. National Museum, and to Miss Mary A. Day for the verification of references and other bibliographical assistance.

MONTANOA, Llav. & Lex. Heads (except in one species) heterogamous with neutral ligulate uniseriate ray-flowers and few to many perfect disk-flowers (the inner sometimes sterile). Involucre subcylindric to hemispherical, its bracts mostly narrow, 1–2-seriate, linear- to lance-oblong, rarely spatulate. Pales keeled, folded about the achenes, papery to subcartilaginous, attenuate or abruptly narrowed to an acute and often spinescent tip, persistent, accrescent, and more or less squarrose in fruit, always somewhat villous (densely so in the first subgenus), but sometimes quite glabrate; receptacle conical. Ligules spreading, usually oblong and emarginate at the end, without styles; achenes of the ray-flowers abortive, empty, pappusless. Disk-flowers regular, tubular, 5-toothed; proper tube slender, throat campanulate, and nerveless teeth ovate, acute. Style-branches slightly thickened upwards and appendaged with a short or slender acumination; achenes thickish, laterally compressed, relatively short, obovate; pappus none. — Pithy-stemmed shrubs, sometimes arborescent, with opposite serrate, dentate, or often lobed leaves, and white or purplish corymbose heads. — Nov. Veg. Desc. ii. 11 (1825); Sch. Bip. in Koch, Wochenschr. vii. 406–408; Benth. & Hook. f. Gen. ii. 364; Hemsl. Biol. Cent.-Am. Bot. ii. 164; Hoffm. in Engl. & Prantl. Nat. Pflanzenf. iv. Ab. 5, 232. *Eriocarpha*, Cass. Dict. Sci. Nat. lix. 236 (1829). *Eriocoma*, HBK. Nov. Gen. & Spec. iv. 267, t. 396 (1820). *Montagnæa*, DC. Prodr. v. 564 (1836). — An exclusively neontogenous and very natural group of 32 distinct species, extending from Northern Mexico to Panama, with outlying species as far

south as the Andes of Ecuador. Three natural subgenera are readily recognizable.

Subg. 1. ERIOCARPHA. Heads small, numerous, corymbose: ligules 2 to 5 or 0: pales conspicuously, densely, and permanently silky-villous, the spinescent tip mostly recurved in fruit: leaves various, 3-nerved. — *Eriocarpha*, Cass. l. c. *Montagnæa* § *Eriocarphæ*, DC. Prodr. v. 564. *Eriocoma*, HBK. Nov. Gen. & Spec. iv. 267. — Seven species, all Mexican.

* Ligules none: disk-flowers only 3 or 4.

1. **M. anomala.** Branches lignescent, pithy, obscurely 4-angled, striate, retaining only short and sparse remnants of a pubescence which in the early stages of growth is evidently copious and silvery: leaves opposite even up to the inflorescence, petiolate, the uppermost (the only ones known) suborbicular, broader than long, 4 cm. in length, 5 cm. in breadth, mucronulate-denticulate, not lobed, puberulent and scabrous above, rusty-tomentose beneath: panicle round-topped, 1.8 dm. broad; the branches and linear bractlets tomentose; heads crowded; involucral scales about 5, uniseriate, linear to linear-lanceolate, silky-villous on the outer surface: corollas densely pubescent except on the tube below. — *Montanoa* sp. Hemsl. Biol. Cent.-Am. Bot. ii. 166, where remarkable character is noted. — Collected by *Bourgeau* in the Valley of Cordova, Vera Cruz, Mexico, 16 March, 1866, no. 2057.

* * Ligules present, (2 to) 5; disk-flowers usually more numerous.

+ Bracts of the involucre, during anthesis, 2.5 to 4 mm. long.

++ Leaves ovate, ovate-deltoid, or lanceolate, sometimes crenate-toothed and hastate, but not otherwise lobed; petioles wingless.

= Leaves crenate-dentate, with base mostly obtuse, truncate, or cordate.

2. M. FLORIBUNDA, Sch. Bip. Branching shrub, 1.5 to 2.5 m. high: branches terete, striate, tomentose, at length glabrate: leaves all or nearly all opposite, ovate or more commonly deltoid-ovate, acute, rounded or more often truncate or broadly cordate at the base, shallowly crenate-dentate, 3 to 6 cm. long, often as broad, scabrous above, more or less sordid-tomentose beneath; petioles 1 to 2 cm. long, tomentose, usually naked, rarely appendaged near the leaf-blade: panicle corymbose, the branches slender, much exceeding the leafy bracts: disk-flowers about 15; ligules 5, from 5.5 to 7 mm. long. — Sch. Bip. in Koch, Wochenschr. vii. 406; Hemsl. Biol. Cent.-Am. Bot. ii. 165, in part (excl. pl. Bourgeau). *Eriocoma floribunda*, HBK. Nov. Gen. & Spec. iv. 268, t. 396. *Montagnæa floribunda*, DC. Prodr. v. 564. — Eastern-central and South-

ern Mexico, from 1,000 to 2,500 m. altitude; between Guadalupe and the city of Mexico, *Humboldt* & *Bonpland*, and at a neighboring station, *Schaffner*; Mountains of Oaxaca, *Galeotti*, no. 2008, *Pringle*, nos. 4969, 5651, *E. W. Nelson*, nos. 1544, 1920, *L. C. Smith*, no. 542, *González*, no. 46, *C. L. Smith*, no. 272.

3. M. TOMENTOSA, Llav. & Lex. In habit and floral characters very similar to the preceding: leaves decidedly longer than broad, conspicuously attenuate, often hastate, with a decided tendency towards coarse crenate dentation near the base, usually subcordate or cordate, scabrous above, canescent-tomentose beneath, 5 to 10 cm. long, 2 to 7 cm. broad; petioles often appendaged above. — Nov. Veg. Descr. ii. 11; Sch. Bip. l. c.; Hemsl. l. c. 166. *Montagnæa tomentosa*, DC. l. c. incl. var. *β cordifolia*. *Eriocoma heterophylla*, Schrad. Linnæa, x. Lit.-Ber. 70. *E. fragrans*, Sweet, Brit. Fl. Gard. ser. 2, t. 44. — State of Mexico, chiefly about the city, *La Llave*, *Bustamente* & *Rocha*, *Berlandier*, no. 574, *Schaffner*, no. 252, *Bourgeau*, nos. 501, 706, *Bilimek*, no. 25, *Pringle*, no. 3155; Morelos at Cuernavaca, *Bilimek*, no. 511; Puebla at Tehuacan, *Liebmann*, no. 262; San Luis Potosi, *Parry* & *Palmer*, no. 714, *Pringle*, no. 3307.

Var. TERNIFOLIA, Hemsl. Leaves ternate. — Hemsl. l. c. in syn. *M. ternifolia*, Sch. Bip. l. c. *Montagnæa tomentosa*, var. *ternifolia*, DC. l. c. 565. — Chopalopa, Mexico, *Berlandier*, no. 574, in part.

= = Leaves serrate, rhombic-ovate or lanceolate in outline, narrowed to a more or less cuneate base.

4. M. Seleriana. Shrub: branchlets terete, soon glabrous: leaves opposite, undivided, callous-serrulate or almost entire, tuberculate-scabrous above, canescent- or tawny-tomentose, at length subglabrate beneath, 5 to 10 cm. long, 2 to 7 cm. broad, 3–5-nerved above the cuneate base; petioles 1 cm. long: panicles rounded, 1 dm. broad; pedicels filiform, tawny-tomentulose: heads much as in the preceding species: ray-flowers 3 to 4; ligules 4 to 5 mm. long; disk-flowers about 9: fruit unknown. — Tuxtla, Chiapas, Mexico, *C. & E. Seler*, 19 February, 1896, nos. 1965, 1943.

+ + Leaves lanceolate, not lobed, conspicuously attenuate into winged petioles.

5. M. MICROCEPHALA, Sch. Bip. l. c. Rusty-tomentose: leaves elliptic-lanceolate, 6 cm. long including the winged petiole, 1.8 to 2 cm. broad, serrate, acute at each end, scabrous above, densely tomentose and minutely glandular beneath: heads very small, slender-pedicelled, numerous but not densely crowded. — Hemsl. l. c. 166; Klatt, Leopoldina,

xxiii. 90 (where the leaves are incorrectly described as glandular above). — Ejutla, Mexico, *Liebmann*, no. 483. Type in herb. Bot. Gard. Copenhagen; a fragment and good drawing in herb. Gray.

++ ++ ++ Leaves (rather large) decidedly lobed, more or less attenuate at the base.

6. **M. myriocephala.** Shrub, copiously branched: stems terete, pithy, at first tomentose, at length glabrate: leaves all opposite, petiolate, 8 to 14 cm. long, about half as broad, scabrous, and minutely tuberculate-puberulent above, thinly tomentose or at length glabrate beneath; lobes broad, the terminal one ovate, acuminate, the lateral single, broad and truncate or somewhat bifid, crenate-serrate or dentate; base of the blade at first abruptly then gradually narrowed and decurrent about half way down the petiole, the wings thus formed terminating rather abruptly and leaving the lower portion (1 to 4 cm.) of the petiole naked: heads very numerous, in open convex terminal corymbs; branches of the inflorescence usually exceeding the leaves; involucral scales 7, ovate-oblong, acute: ligules 6 to 7 mm. long, 4 mm. broad; disk-flowers about 9. — Jalisco, at Chapala, October–November, 1886, *Dr. Edward Pulmer*, no. 714; Oaxaca, 9 km. above Dominguillo, altitude 1,380 to 1,690 m., 30 October, 1894, *E. W. Nelson*, no. 1854, below Jayacatlan, altitude 1,000 m., 19 October, 1895, *L. C. Smith*, no. 923; Puebla, between Petlacingo and Acatlan, altitude 1,070 m., 20 November, 1894, *E. W. Nelson*, no. 2000; Chiapas, between Hacienda Juncana and San Vicente, altitude 1,300 to 1,800 m., *E. W. Nelson*, no. 3503. Types in herb. Gray and herb. U. S. National Museum.

7. M. XANTHIIFOLIA, Sch. Bip. l. c. Similar to the preceding, the leaves of different contour, very scabrous above, 1.2 dm. long, 9 cm. broad, 3-lobed, cuneately narrowed into a stoutish rusty-tomentose petiole; the lobes upwardly directed, ovate or triangular, acute to caudate-acuminate, glandular-denticulate: disk-flowers about 10; ray-flowers 2 to 3; spinescent tip of the pales strongly reflexed in fruit. — Hemsl. l. c.; Klatt, l. c. & Bull. Soc. Bot. Belg. xxxi. pt. 1, 201. — Chacalepa Estate, Mexico, *Liebmann*, no. 265; also Rodeo, Costa Rica, altitude 750 m., *Pittier*. Type in herb. Bot. Gard. Copenhagen; a good drawing and fragments in herb. Gray.

+ + Bracts of the involucre, during anthesis, 5 to 6 mm. long.

8. M. PALMERI, Fernald. Shrub: branches tomentulose above, but soon quite glabrate: leaves broadly ovate, more than half as wide as long, some of them strongly angled or shallowly lobed, caudate-acumi-

nate, crenulate, 1.4 dm. long; petioles 3 cm. long: heads in a loose leafy panicle. — Proc. Am. Acad. xxxiii. 93. — Hillsides near Acapulco, *Palmer*, no. 44. Type in herb. Gray.

9. M. Rosei, Robinson & Greenman. Similar to the last, but with lance-ovate serrate unlobed leaves, bullate above, green beneath, not half so broad as long: heads numerous, very silky, borne on filiform pedicels. — Proc. Am. Acad. xxxii. 45. *Montanoa* sp. Rose, Contrib. U. S. Nat. Herb. i. 103. — Alamos, W. Mexico, *Palmer*, no. 394, *Goldman*, no. 294. Type in herb. Gray.

Subg. 2. Acanthocarpha. Heads of medium size, less numerous: ligules 7 to 10: pales sub-glabrous or thinly villous, the spinescent tip straight or recurved. — *Montagnæa* § *Acanthocarphæ*, DC. l. c. 565. — Leaves ovate to lance-oblong, crenate, serrate, angled or palmately lobed, very rarely (*M. macrolepis*) pinnately lobed. Nineteen species of Mexico and Andean South America.

* Involucral bracts (1 cm. long) spatulate-obovate, considerably exceeding the disk-flowers.

10. M. Pringlei. Shrub: branches glabrate, covered with a rough gray cortex; branchlets pulverulent-tomentulose: leaves lanceolate or oblong-lanceolate, acute, serrate, 4 to 8 cm. long, 1.5 to 3 cm. broad, green and scabrous above, canescent-tomentose beneath, gradually narrowed into wings decurrent nearly to the base of the petiole: heads few, 2 or 3 at the ends of the branches, on slender erect peduncles (4 to 5 cm. long): ligules about 7, from 6 to 8 mm. long: pales (in anthesis) gradually attenuate, villous. — Calcareous hills near Tehuacan, Puebla, 28 July, 1897, *C. G. Pringle*, no. 7491. Well marked by its spatulate involucral bracts, which appear to be unique in the genus. Type in herb. Gray.

* * Involucral bracts broadly oblong, obtuse or rounded at the apex (7 to 10 mm. long, half as broad): leaves pinnately and sinuately 3(–5)-lobed.

11. M. macrolepis, Robinson & Greenman. Shrub, 1 to 2 m. high: heads few (1 to 5 at the ends of the branches), 1 to 2 cm. in diameter exclusive of rays, conspicuous and well marked in fruit by the elongated gradually attenuate straightish pungent stramineous ciliate but otherwise glabrate pales. — Proc. Am. Acad. xxxii. 44. — Oaxaca, Las Sedas, *Pringle*, no. 4932, Nacaltepec (Salomé), *L. C. Smith*, no. 818, 29 km. southwest of the city of Oaxaca, *E. W. Nelson*, no. 1375. Type in herb. Gray.

* * * Involucral bracts smaller and narrower, linear-oblong to linear.

+ Leaves oblong-lanceolate, subsessile or attenuate at the base to a winged or relatively short naked petiole: heads rather few, in leafy cymes or loose panicle.

12. M. SAMALENSIS, Coulter. Suffrutescent (?), "about 3 m. high," cymosely branched above, the branches sordid-tomentose, at length glabrescent: leaves crenate, deep green and more or less tuberculate, puberulent, and scabrous above, at first canescent-tomentose, at length green and glabrate beneath, 8 to 24 cm. long, a third as broad, passing without sharp demarcation into a short more or less winged petiole: peduncles axillary, 4 to 7 cm. long, simple or few-branched; involucral scales oblong, acutish, canescent-tomentose on the outer surface: rays about 10, from 1.2 to 1.5 cm. long: pales truncate, with spinescent mucro. — Bot. Gaz. xx. 49. — Guatemala, on the Rio Samalá, Depart. Retalhulen, altitude 500 m., *J. Donnell Smith*, no. 2858; also recently found in Zacatecas, Mexico, near Monte Escobedo, *Rose*, no. 2657, an interesting extension of range.

+ + Leaves sinuately and palmately 5(–7)-lobed, lobes acuminate; petioles auricled near the summit, otherwise wingless.

13. M. HIBISCIFOLIA, Benth. Leaves large, broadly cordate, 2 to 3 dm. broad, orbicular or reniform in general contour, sinuate-lobed nearly to the middle or sometimes much more deeply palmatifid; petioles enlarged and at first woolly toward the connate bases, bearing near the summit two oblong auricles: heads numerous in a corymb: ligules 8 to 10, 1 cm. long, white with roseate tinge: pales in fruit 1 cm. long, broad, emarginate, shortly mucronate. — Benth. acc. to Sch. Bip. in Koch, Wochenschr. vii. 407; Hemsl. l. c. 165; J. Donnell Smith, Enum. Pl. Guat. pt. 4, 85; Klatt, Bull. Soc. Bot. Belg. xxxi. pt. 1, 201. *Montagnæa hibiscifolia*, Benth. in Oerst. Vidensk. Meddel. 1852, p. 89. — Nicaragua, Segovia, *Oersted*, no. 235; Costa Rica, Volcan de Barba, *Oersted*, no. 134, thickets on the banks of the Rio Torres, *Tonduz*, no. 8478b; Guatemala, Depart. Santa Rosa, altitude 600–1,500 m., *Heyde & Lux*, nos. 3805, 6155, of Mr. J. Donnell Smith's sets; Chiapas, near Yajalon, *E. W. Nelson*, no. 3417.

+ + + Branchlets thick, more or less 4-angled: leaves large, suborbicular or polygonal, about as broad (9 to 17 cm.) as long; petioles not winged.

++ Leaves puberulent but not scabrous above.

14. M. QUADRANGULARIS, Sch. Bip. l. c. Glabrescent shrub: leaves large (1.5 dm. long, 1.7 dm. broad), thin, rounded throughout or obtusely 1–2-angled on either side, obtuse or broadly cordate and sometimes

slightly auricled at the base, little paler beneath, the margin essentially entire; petioles 4 to 10 cm. long: heads rather small, 8 mm. in diameter (excl. of ligules), on flexuous pubescent pedicels in a loose panicle: rays about 5, white, 7 mm. long. — Temperate regions on the Andes of Venezuela, Merida, *Moritz*, no. 1386; Quebrada near Quetame, U. S. Colombia, *André*, no. 862.

15. **M. guatemalensis.** Leaves subcoriaceous, wholly glabrate above, and canescent-tomentulose beneath, subentire, 1 dm. in breadth: heads larger, 1 cm. broad in anthesis; rays 1.5 cm. long: otherwise similar in most of its characters to the preceding species. — *M. patens*, Coulter in J. Donnell Smith, l. c., not Gray. — Guatemala on the Volcano Jumaytepeque, Depart. Santa Rosa, altitude 1,800 m., *Heyde & Lux*, December, 1892, no. 4216 of Mr. J. Donnell Smith's sets.

++ Leaves scabrous above.

16. **M. hexagona.** A large tree: branchlets thick, strongly quadrangular, fulvous-tomentose above, at length glabrate: leaves hexagonal-ovate, distinctly and rather regularly serrate, about 1.4 dm. long, 1.3 dm. broad, acute or subacuminate, scabrous-puberulent above and arachnoid-tomentose beneath even in age, obtuse and unappendaged at the base; petioles thick, channelled above, wingless, tomentose, 7 cm. long: heads numerous and rather large in a very regular opposite-branched leafy-bracted panicle; pedicels 1.5 cm. long: involucral bracts lance-oblong, 2-seriate, acute, 3 to 4 mm. long: ligules 8 to 10, white, more than 2 cm. long: fruit unknown. — Temperate regions in the mountains of Chiapas. *Ghiesbreght*, no. 535; flowering in October. Type in herb. Gray.

+ + + + Leaves petioled, ovate or ovate-lanceolate, 4 to 7 cm. broad, crenate or serrate, or shallowly 1-lobed on either side.

++ Erect shrubs (at least showing in specimens no sign of climbing or trailing habit): leaves of membranous but of firm often harsh texture: peduncles erect or nearly so.

= Pales gradually narrowed to a long stout at length squarrosely spreading or recurved stramineous spinescent tip.

17. **M. FRUTESCENS**, Hemsl. Shrub, 3 m. high, with terete glabrous or early glabrate often purple branches: leaves ovate-lanceolate, serrate, caudate-acuminate, narrowed and unappendaged at the base, bright green and scabrous above, slightly paler and glabrate beneath: heads (not numerous) on stiffish peduncles; disk globose, in anthesis 1.3 cm. broad: rays about 8, 1 cm. long, white: pales nearly glabrous, accrescent, at length 1 to 2 cm. long, contorted and squarrose, thickish, firm and pun-

gent. — Biol. Cent.-Am. Bot. ii. 165. *Montagnæa frutescens*, Mairet in DC. Prodr. v. 565. *Aldama Montanoa*, Sch. Bip. in Koch, Wochenschr. vii. 406. — Mexico without locality, *Mairet*, *Bates* (1846); Valley of Mexico, *Berlandier*, no. 908, *Bourgeau*, nos. 592 (leaves sometimes 3-lobed), 966, *Pringle*, no. 7196; Michoacan, cool cañons near Patzcuaro, *Pringle*, nos. 4270, 5059.

18*. M. ARBORESCENS, Sch. Bip. l. c. 406. From description very near the preceding and differing chiefly in the inflexed points of its fruiting pales. — Hemsl. l. c. 164, only in part. *M. floribunda*, Cerv. and *Eriocoma arborescens*, Alam. acc. to DC. l. c. *Montagnæa arborescens*, DC. Prodr. v. 565. — Mexico without locality, *Alaman*, *Mairet*; Cordillera Guchilaqua, *Berlandier*, no. 1006.

= = Fruiting pales scarious-papery, rather abruptly contracted to a short more or less spreading point.

***a.* Leaves green beneath: Mexican.**

19. **M. purpurascens.** Sordid-tomentose shrub: leaves ovate-rhombic or sometimes hastate, caudate-acuminate, crenate-serrate, more coarsely so toward the base, scabrous above, green but tomentose and often somewhat scabrous beneath, cordate to subcuneate and commonly biauriculate at the insertion of the petiole, 4 to 12 cm. long, 2 to 8 cm. broad; petioles tomentose, 1 to 2 cm. long: heads rather numerous in an open leafy-bracted corymb: rays 8 to 10, nearly 2 cm. long: fruiting pales turning purple, 1 cm. broad when flattened out. — *M. grandiflora*, Hemsl. l. c. 165, as to pl. Hartweg. *Montagnæa grandiflora*, Benth. Pl. Hartw. 19, not DC. — Aguas Calientes, *Hartweg*, no. 134; cañons and hills about Zacatecas, *Pringle*, nos. 2184, 3985, *Rose*, no. 3647; Guanajuato, *Guillemin-Tarayre*, *Dugès*, no. 456; Faval, *W. Schumann*, no. 115. **Types in herb. Gray.**

***b.* Leaves canescent-tomentose beneath: South American.**

20. M. OVALIFOLIA, Sch. Bip. Shrub, 2 to 3 m. high, "subscandent," tomentose: leaves deltoid-ovate, 6 to 8 cm. long, three fourths as broad, permanently tomentose upon both surfaces, white beneath, serrate, acuminate: heads on tomentose peduncles (1.5 to 4 cm. long) few or more numerous and disposed in a regularly branched open panicle: rays about 10, from 1.8 to 2 cm. long: pales (still young) with a short sharp straight or often incurved point. — Sch. Bip. in Koch, Wochenschr. vii. 407. *Montagnæa ovalifolia*, DC. l. c. 566. ? *Verbesina atriplicifolia*, Juss. & Desf. in Colla, Hort. Rip. 144, t. 31 (but ray depicted as styliferous). *Montanoa atriplicifolia*, Klatt, Leopoldina, xxiii. 90, at least

in part, not however Sch. Bip. in Seem. Bot. Herald, 304. — Apparently common about Bogota, where coll. by *Funck & Schlim*, without number, *Holton*, no. 364; also in Ecuador at Chiquiribamba, altitude 3,000 m., *André*, no. 4444.

= = = Fruiting pales as in the last group but their points decidedly recurved and uncinate.

a. Leaves rarely lobed, tomentose beneath.

21. M. UNCINATA, Sch. Bip. l. c. 406. Shrub, 2 to 4 m. high: sordid- or canescent-tomentose upon the younger parts: leaves ovate-lanceolate, serrulate, undivided or sub-3-lobed, caudate-acuminate at the apex, narrowed to an inconspicuously or obsoletely biauriculate base; petioles tomentose, 2 to 3 cm. long: heads numerous in an open corymb: fruiting pales conduplicate, obovate, somewhat narrowed below, stramineous, passing at the summit into a small recurved point. — Hemsl. l. c. 166. — Mexico, Cumbre de Estepa, *Liebmann*, no. 484, also mountains of Oaxaca, *Pringle*, no. 4929, *E. W. Nelson*, nos. 1853, 1959, *C. & E. Seler*, no. 1512, *C. L. Smith*, no. 243. Type number in herb. Gray.

b. Leaves mostly angulate-lobed, pruinose-tomentulose beneath.

22. M. PATENS, Gray. Shrub, 2 to 4 m. high: branches pruinose-puberulent: leaves broad and distinctly 3(–5)-angled or -lobed, abruptly contracted to a biauriculate base, green and scabrous above, paler beneath, 1.2 to 2 dm. long, 7 to 14 cm. broad, apex and upper lobes acute, the lower angles mostly obtuse; petioles 2 to 3 cm. long: corymb 2 to 3 dm. broad; heads (incl. rays) 2 to 3 cm. broad; pedicels slender; pales much as in the preceding, at length very large, 1.1 cm. long; the wings with short rounded lateral lobe. — Proc. Am. Acad. xxi. 388. *M. atriplicifolia*, Sch. Bip. in Seem. Bot. Herald, 304, as to plant Seemann, but not as to synon. *M. arborescens*, Hemsl. l. c. 164, in part, not *Montagnæa arborescens*, DC. l. c. 565. — S. W. Chihuahua, *Palmer*, August to November, 1885, no. 164, *Goldman*, no. 216; Sonora, altitude 1,200 m., *Hartman*, no. 302; N. W. Mexico, *Seemann*; Alamos, *Palmer*, no. 361; Oaxaca at Jayacatlan, altitude 1,300 m., *L. C. Smith*, no. 266. Type in herb. Gray.

= = = = Fruiting pales retuse at the summit and tipped with a short straight mucro.

23. M. SUBTRUNCATA, Gray. Branches somewhat 4-angled; branchlets, pedicels, and petioles subglabrous: leaves ovate, serrate, acuminate, with or without one or two obtuse angles at the sides, truncate or broadly

subcordate at the exauriculate base: fruiting heads (1.4 cm. in diameter) considerably smaller than in the preceding related species. — Proc. Am. Acad. xxii. 424. — Jalisco on the Rio Blanco, *Palmer*, no. 599, near Guadalajara, *Pringle*, nos. 2467 (distr. as *M. patens*), 4545; at Balaños, *Rose*, no. 2939. Readily distinguished by the retuse pales.

++ Climbing shrubs with slender terete stems, thinner more delicate leaves, and long slender and mostly hooked peduncles: clematoid plants of lower and more tropical regions than the preceding group: nearly related and imperfectly known species.

= Leaves large (1.2 dm. long), crenate-serrate, conspicuously appendaged at the base, obsoletely 3-lobed, caudate-acuminate, some of the upper ones usually alternate.

24. **M. Pittieri.** Branchlets green, in dried state striate, at first tomentulose, soon only puberulent or wholly glabrate: leaves ovate or somewhat rhombic in general contour, with a shoulder-like angle or short lobe on each side, appressed-puberulent not scabrous above, somewhat paler and soft-puberulent beneath, crenate-serrate with mucronulate teeth, rounded at the base but extended at the insertion of the petiole into a quadrate biauriculate appendage; petioles (2 to 3 cm. long) pubescent: peduncles alternate (4 cm. long), very flexuous and at length recurved: heads not numerous, in anthesis 1.1 to 1.2 cm. in diameter excl. rays; the latter about 8, white, 1.5 cm. long; involucral bracts about 6, lanceolate, acute, 4 mm. long; pales in young fruit papery, obovate, erose-dentate, tipped at the usually retuse summit with a short sharp incurved point. — *M. hibiscifolia*, Klatt, Bull. Soc. Bot. Belg. xxxi. 201, not Benth. — Costa Rica, in a hedge on the llanos of Alajuelita, *Pittier*, no. 1455.

= = Leaves smaller (4 to 9 cm. long), deltoid-ovate, acuminate, mostly opposite to the summit of the stem, serrate, undivided or somewhat 3-lobed, rounded, truncate, or subcordate at the base but often with a slight appendage or short acumination at the insertion of the petiole.

25. M. PAUCIFLORA, Klatt. Puberulent: leaves slightly scabrous above, regularly serrate, undivided and shallowly but acutely 3-lobed upon the same shoot; petioles 1 to 4 cm. long: heads few or many; involucral bracts oblong- or linear-lanceolate, 4 mm. long, pubescent: branches of the inflorescence opposite and divaricate, flexuous: ligules 1.3 to 1.5 cm. long. — Leopoldina, xxiii. 90. *Coreopsis trilobata*, Vahl in herb. acc. to Klatt, l. c. — South America without locality, "e pl. West." With Dr. Klatt's not over satisfactory type we should identify the following: J. Donnell Smith's no. 4242, coll. *Heyde & Lux* at

Casillas, Depart. Santa Rosa, Guatemala, altitude 1,200 m. and no. 5324 of the same set, coll. *Thieme* at San Pedro Sula, Honduras, altitude 250 m. In these plants, which are old enough to show immature fruit, the pales are not only retuse and mucronate at the apex, but have the wings more or less 2-lobed. Type in herb. Gray.

26. M. Schottii. Similar in habit: leaves ovate, unlobed, unappendaged, serrate, decidedly scabrous above, sordid-tomentulose beneath, 9 cm. long: heads decidedly larger than in the preceding species: involucral scales linear, acute, 7 mm. long, pubescent; ligules (about 10) 2.2 cm. long.—Yucatan, on a road between Merida and Sisal, *Dr. Arthur Schott*, 24 October, 1865, no. 913. Type in herb. Field Columbian Museum.

= = = Leaves similar in size and contour but dentate with more spreading teeth.

27. M. DUMICOLA, Klatt. Puberulent: leaves deltoid-ovate, unlobed, dentate rather than serrate, 5 to 6 cm. long, nearly as broad: heads in all observed characters identical with *M. pauciflora* described above. — Bull. Soc. Bot. Belg. xxxi. 200. — Costa Rica, in a hedge on llanos of Alajuelita, altitude 1,100 m., *Pittier*, no. 1454 (from the same locality as *M. Pittieri*, which differs much in the size, contour, and seration of its leaves). Type in herb. Gray.

= = = = Leaves ovate-lanceolate, rather gradually narrowed to an unappendaged base, serrate, about 5 cm. long.

28. M. GRACILIS, Sch. Bip. l. c. 407. Also near *M. pauciflora*, from which it differs solely, so far as can be learned, in its more lanceolate-ovate leaves, cuneately narrowed at the base, and in its less numerous ligules (5 in number). — Klatt, Leopoldina, xxiii. 91. — S. Miguel, La Grabra, *Liebmann*, no. 633. Type in herb. Bot. Gard. Copenhagen (?); a leaf and good sketch in herb. Gray. If Dr. Klatt is correct in stating the involucral bracts to be glabrous, the species is in this regard very different from the related members of the genus.

Subg. 3. UHDEA. Heads very large, 4.5 to 8 cm. in diameter incl. the 8 to 12 white or purplish rays: leaves large, sinuate-lobed, mostly pinnatifid. — *Uhdea*, Kunth, Ind. Sem. Hort. Berol. 1847, p. 13, & Ann. Sci. Nat. ser. 3, ix. (1848), 316. — Probably to be reduced to the following four species, all of Mexico.

* Petioles with broad undulate wings extending to the base; lobes of the leaves very unequal.

29. M. GRANDIFLORA, Sch. Bip. Tall shrub, 2 to 4 m. high: young branches canescent with minute pulverulent pubescence: leaves large,

3 dm. long including the petiole, scabrous above, at first canescent and velvety-tomentose but at length pale green and merely tomentulose beneath; lobes about 7, acuminate, serrate, the middle ones much larger than the others and again 2–4-lobed; winged petioles 6 to 8 cm. long, half as broad, flat, irregularly crenate-toothed, auriculate-amplexicaul at the base: heads numerous, showy: fruiting pales gradually narrowed to a point. — Sch. Bip. in Koch, Wochenschr. vii. 408; Hemsl. l. c. 165, only in part if at all. ? *M. mollissima*, Brongn. acc. to Groenland, Rev. Hort. ser. 4, vi. (1857), 543; Sch. Bip. in Koch, Wochenschr. vii. 408. *Montagnæa grandiflora*, DC. Prodr. v. 565. *Eriocoma grandiflora*, Alam. and ? *Priestleya longifolia*, Fl. Mex. Icon. acc. to DC. l. c. — Hills about Patzcuaro, Michoacan, *Pringle*, no. 3306; Guanajuato, *Dugès*, no. 456a. Originally collected in Mexico without locality by *Alaman*.

*** * Petioles with wings narrow, irregular, incomplete, or none.**

+ Leaves permanently canescent-tomentose beneath.

30. M. SPECIOSA, Sch. Bip. l. c. Wings of the petiole narrow, crisped, crenate-lobed: inflorescence a simple corymb, the primary branches 5 to 8 cm. long, 1-headed. — Hemsl. l. c. 166. — *Montagnæa speciosa*, DC. l. c. 565. — Cuernavaca, Morelos, *Berlandier*, no. 1057. Said (probably erroneously) to be herbaceous. Not secured by recent collectors. Type number in herb. Gray.

+ + Leaves soon green and merely puberulent beneath.

31. M. PYRAMIDATA, Sch. Bip. l. c. 408. Erect shrub, 3 m. high, with pithy stems and obtusely 4-angled branches: leaves sinuate-pinnatifid with 7 to 9 oblong-lanceolate acuminate serrate very unequal lobes; intermediate lobes 2-cleft; petioles narrowly or obsoletely winged and bearing near the summit several rounded lobes, and at the base usually large foliaceous amplexicaul auricles: heads in a compound corymb; fruiting pales papery, obovate, subtruncate, with short delicate point. — Hemsl. l. c. 166. *M. grandiflora*, Hemsl. l. c. 165, in part, as to pl. Bourgeau. — Jalisco, Guadalajara, *Oliva*, *Palmer*, no. 492, *Pringle*, no. 2930; Morelos, at Cuernavaca, *Bourgeau*, no. 1199, *Pringle*, no. 7044; near the boundary of Oaxaca and Puebla, altitude 1,470 to 2,000 m., *E. W. Nelson*, no. 1984; Colima, *Palmer*, no. 1159 (coll. of 1891).

32. M. BIPINNATIFIDA, C. Koch. Similar to the preceding in most regards: lobes of the leaves 9 to 11, narrowly oblong, subequal, although the second and third pairs are 2–3-lobed; petioles channelled but not winged or appendaged except at the summit and base where provided with two or more small rounded or obtuse auricles: heads in a compound

corymb; pedicels 3 to 5 cm. long, tomentose; involucral scales lanceolate, externally tomentose, 8 to 10 mm. long: ligules about 12, oblong, cuneate at the base, 3 cm. long. — Wochenschr. vii. 407; Hemsl. l. c. 165. *M. heracleifolia*, Brongn. acc. to Groenland, Rev. Hort. ser. 4, vi. (1857), 544, nomen nudum. *Uhdea bipinnatifida*, Kunth, Ind. Sem. Hort. Berol. 1847, p. 13. *Polymnia grandis*, Hort. acc. to Kunth, l. c. *Montagnæa heracleifolia*, Brongn. acc. to André, Rev. Hort. 1863, p. 370 (where heads are said to be small and rays six). — Discovered (acc. to Koch, l. c.) by *Uhde* at Matamoras (Puebla?), Mexico, and sent to the Berlin Garden in 1845. Subsequently cultivated at various places, but apparently not secured by recent collectors in Mexico.

Doubtful or Transferred Species.

M. Aschenbornii, Sch. Bip. in Koch, Wochenschr. vii. 407, collected by Aschenborn in Mexico (?), is described merely as having deltoid-ovate serrate leaves pubescent only upon the nerves and larger veins beneath; the petioles thickened and pales straight. — Type in herb. Bot. Museum Berlin.

M. atriplicifolia, Klatt. See synon. of *M. ovalifolia*, Sch. Bip.

M. atriplicifolia, Sch. Bip. See synon. of *M. patens*, Gray.

M. clematidea, Hemsl. l. c. 165. See synon. of *M. Karwinskii*, Sch. Bip. below.

M. crenata, Sch. Bip. in Koch, Wochenschr. vii. 407, collected by de Berghes in Mexico without locality, is described as having stout petioles and ovate crenate leaves 7.7 cm. long and 2.8 cm. broad, 3-nerved from above the shortly cuneate base and tomentose beneath; the pales straight-pointed. — No plant satisfactorily corresponding to this species seems to have been secured in recent years.

M. elegans, C. Koch, Wochenschr. vii. 408, Hemsl. l. c. 165, of unknown country and characterized only as to leaf contour, must be most nearly related to if not identical with *M. pyramidata*, Sch. Bip., from which so far as known it differs only in the absence of the inconstant petiolar appendages.

M. heracleifolia, Brongn. See synon. of *M. bipinnatifida*, C. Koch.

M. heterophylla, Hemsl. Biol. Cent.-Am. Bot. ii. 166, in syn. is a clerical error for *Eriocoma heterophylla*, Schrad., which is *M. tomentosa*, Llav. & Lex.

M. Karwinskii, Sch. Bip. l. c. 407, as *Karwinskyi* (*Montagnæa Karwinskii*, DC. l. c. 565; also *M. clematidea*, Walp. Linnæa, xiv. 308,

& Rep. ii. 612, acc. to Sch. Bip. l. c., hence *Montanoa clematidea*, Hemsl. l. c. 165). Stem herbaceous (?), terete, subglabrate: leaves opposite, petiolate, ovate, obtusely sinuate, 3–5-nerved from the base, very sparsely pubescent: panicles lax, many-headed; involucral scales linear-lanceolate, acuminate, unequal: ligules 10, obovate-oblong, 1 to 1.2 cm. long, 4 to 6 mm. broad. — Mexico, without locality, *Karwinski*. The writers have seen no specimen of this species and fail to place it satisfactorily.

M. Olivæ, Sch. Bip. l. c. 406, is, according to the original brief characterization, distinguished by its small (3.5 cm. long) ovate serrate leaves (which on the lower surface have not only a soft pubescence but glands) and glabrous pales. — Guadalajara, *Dr. Oliva*, in 1855. We have seen no species of this nature, and as the region about Guadalajara has been repeatedly and thoroughly explored in recent years by Mr. Pringle and Dr. Palmer without bringing to light a *Montanoa* of this type it seems likely that the plant described by Schultz belonged to some other genus, as the glabrous pales would suggest.

M. Orbignyana, Klatt, Abh. Naturf. Gesellsch. z. Halle, xv. 328, p. 8 of reprint, is *Hyptis crenata*, Pohl!

M. purpurea, Brongn. acc. to Groenland, Rev. Hort. ser. 4, vi. (1857), 544, and *Montagnæa purpurea*, Brongn. acc. to André, Rev. Hort. 1863, p. 370, are merely names.

M. Thomasii, Klatt, Abh. Naturf. Gesellsch. z. Halle, xv. (1882), 328, is *Gymnolomia patens*, Gray. The types of both species are in herb. Gray.

M. triloba, Sch. Bip. in Koch, Wochenschr. vii. 406, is wholly dubious, resting upon a brief and very imperfect characterization based upon a specimen of unknown origin. It is said to resemble *M. xanthiifolia*, Sch. Bip., but to have 3–5-lobed leaves with soft pubescence.

Montagnæa ensifolia, Sch. Bip. in Seem. Bot. Herald, 304, is *Gymnolomia ensifolia*, Benth. & Hook. f.

Montagnæa heterophylla, Walp. Rep. ii. 612, is *Montanoa tomentosa*, Llav. & Lex.

PERYMENIUM, Schrad. Heads (mostly small or of medium size) heterogamous; ray-flowers ligulate, styliferous, fertile; disk-flowers perfect, regular. Involucre hemispherical, campanulate or subcylindric, the bracts 1–4-seriate, appressed or squarrose, often ciliated. Pales carinate, folded about the achenes; receptacle convex. Disk-flowers with a rela-

tively short tube, rather long throat and 5 ovate teeth. Appendages of the style-branches short. Disk-achenes laterally compressed, the ray-achenes triangular, both wingless; pappus of several to many unequal awns; these sometimes slightly connate below. — Perennial herbs, undershrubs or tall shrubs, with opposite entire, serrate, or crenate (not lobed) 3-nerved usually scabrous leaves, and solitary to umbelliform-corymbose heads. Flowers yellow. — Ind. Sem. Hort. Gotting. 1830; Linnæa, vi. (1831), Lit.-Ber. 73; DC. Prodr. v. 608 (excl. synon. *Schistocarpha*); Benth & Hook. f. Gen. ii. 377; Hemsl. l. c. 180; Hoffm. in Engl. and Prantl, Nat. Pflanzenf. iv. Ab. 5, 236. — DeCandolle in 1836 enumerates 8 species, Bentham and Hooker in 1873 ascribe to the genus 10 species, Hemsley in 1881 enumerates 12 named species within the limits of the Biologia Centrali-Americana, and Hoffmann in 1890 places the species at 13, — a number which is just doubled in the present revision. The species are chiefly local, and are most numerous in Southern and Central Mexico. The genus as a whole ranges from Northern Mexico to the United States of Colombia.

§ 1. Scales of the involucre subequal, herbaceous, uniseriate or obscurely biseriate: heads few, long-peduncled from the ends of the branches; ligules 8 to 12, showy for the genus, 1 to 1.4 cm. in length: herbaceous or nearly so with several mostly decumbent stems from a thick lignescent root or stock.

* Involucral scales covered with a rather coarse somewhat spreading pubescence and often ciliate.

– Involucral scales broad, ovate-oblong, obtuse or rounded at the apex.

1. P. TENELLUM, Gray. Stems prostrate, spreading, with numerous assurgent simple 1–2-headed branches: leaves oval or elliptical, obtuse, pubescent, crenate-serrate, rugose above, scarcely paler beneath, rounded at the base, 1.5 to 2 cm. long, 1.2 to 1.8 cm. broad; petioles coarsely pubescent, 3 mm. long: peduncles 3 to 8 cm. long; involucral scales about 10: rays about as many, elliptical, 1 cm. long, 5 to 6 cm. broad. — Proc. Am. Acad. xv. 36; Hemsl. Biol. Cent.-Am. Bot. ii. 182. — Mountains of San Luis Potosi, *Schaffner*, no. 302, *Parry & Palmer*, no. 450; also between Sta. Gertrudis and Sta. Teresa in the Sierra Madre of Tepic, *Rose*, nos. 2077, 3313; also a doubtful specimen from the Sierra of Guanajuato, altitude 2,000 m., *Guillemin-Tarayre*. Likely to be reduced to the following.

2*. P. BARCLAYANUM, DC. This species, said to be a subscandent undershrub, does not differ materially from the preceding in other described

characters. — Prodr. v. 608; Hemsl. Biol. Cent.-Am. Bot. ii. 180. — Characterized from a plant cultivated in Mexico. Not seen by the writers.

+ + Involucral scales narrower, ovate-lanceolate, acute or at least much narrowed to an obtuse tip.

3. P. BUPHTHALMOIDES, DC. Suffruticose: branches appressed-puberulent: leaves opposite, subsessile, elliptic-lanceolate, acuminate, 3–5-nerved at the base, coarsely serrate, sparingly puberulent above, puberulent especially upon the veins beneath; peduncles terminal, elongated, subsolitary: involucre campanulate; scales oblong-lanceolate, subacute, appressed-puberulent: rays 7 to 10, oblong, 1.5 cm. long, 4 to 5 mm. broad. — Prodr. v. 609 (whence descr. is compiled); Hemsl. l. c. 181. — Mexico, *Alaman*, acc. to DC. Having seen no authentic specimen of this species we have been obliged to interpret it from the description and from a careful drawing in the Klatt herbarium. To this species we refer Pringle's no. 7636, collected on the Serrania de Ajusco, in the Federal District, Mexico, altitude 3,000 m. Most of its leaves are acute but a few are acuminate and the pubescence of the involucral scales is not appressed.

4. P. Rosei. Stems from a lignescent base, erect or nearly so, 3 dm. high, covered with a coarse spreading pubescence: leaves ovate to oblong-lanceolate, coarsely and sharply serrate-dentate, acute, green and pubescent on both surfaces, 3–5-nerved from the rounded essentially sessile base, 3 to 4 cm. long, 1 to 1.5 cm. broad: peduncles mostly 2 or 3 at the ends of the branches, 5 to 8 cm. long, 1-headed; involucral scales about 10, oblong-lanceolate, acute, 8 mm. long: rays about 7, bright orange, elliptical, 1.3 cm. long, 9 mm. broad. — Road between Mesquites and Monte Escobedo, Jalisco, *Dr. J. N. Rose*, 26 August, 1897, no. 2608. Types in herb. U. S. Nat. Museum and herb. Gray.

* * Involucral scales minutely strigose with closely appressed hairs not ciliate.

5. P. CERVANTESII, DC. Stems numerous, decumbent, subsimple, appressed-puberulent: lowest leaves ovate, the others narrowly elliptic, strongly 3-nerved, regularly but rather finely and remotely serrate, scabrous-puberulent, acute, green on both sides: peduncles long, mostly solitary at the ends of the stems; involucral scales ovate-lanceolate, narrowed to an obtusish or acute tip: rays about 11, oblong, 1.5 cm. in length, 4 mm. in breadth. — Prodr. v. 609; Hemsl. Biol. Cent.-Am. Bot. ii. 181. — Valley of Mexico, Santa Fé, *Bourgeau*, no. 378, Flor de Maria, *Pringle*, no. 3169.

§ 2. Scales of the involucre decidedly unequal, imbricated in 2 to 4 rows, the outer shorter: mostly shrubs.

* Heads (seldom numerous) borne on long pedicels (6 to 10 cm. in length) or umbellately clustered at the summit of long nearly naked peduncles.

+ Perennial herb with short thick woody stock and fibrous roots: leaves conduplicate.

6. P. JALISCENSE, Robinson & Greenman. Scabrous-puberulent throughout: middle and upper leaves oblong or narrowly elliptic, regularly folded along the midnerve, recurved: involucral scales short, ovate, finely puberulent, obtuse, scarcely or not at all ciliate. — Am. Jour. Sci. ser. 3, l. 154. — Rocky Hills about Guadalajara, Jalisco, *Palmer*, no. 310, *Pringle*, no. 5426.

+ + Perennial herb from a long stout root: rameal leaves small, elliptic-oblong, entire.

7. P. PARVIFOLIUM, Gray. Stems 3 dm. or more high, copiously branched: stem-leaves ovate, 2 to 4 cm. long; the rameal 7 to 12 mm. long, numerous: heads on relatively short erect pedicels umbellately clustered at the ends of long peduncles (1 to 1.5 dm. in length); involucral scales blunt, ciliate. — Proc. Am. Acad. xv. 36; Hemsl. l. c. 182. — Mountains of San Luis Potosi, *Schaffner*, no. 352, *Parry & Palmer*, no. 475; Durango, *Palmer*, no. 320 (coll. of 1896), *Nelson*, no. 4624.

+ + + Shrub: rameal leaves large, ovate, serrate.

8. P. subsquarrosum. Stems distinctly woody; branches opposite, scabrous-puberulent: leaves large, ovate, 7 cm. long, 3 to 3.5 cm. broad, serrate, acute, rounded at the base, green and scabrous-pubescent on both surfaces; petiole about 2 mm. long: heads 7 mm. broad (excl. of the rays), borne on long pedicels from the upper axils or on shorter pedicels in a pedunculate umbel; involucre campanulate, the scales with obtuse herbaceous tips tending to be squarrose: rays about 10, orange-yellow, brownish towards the base, 1.2 cm. long, 5 mm. broad: achenes of the disk-flowers slender, slightly constricted above. — Near Plateado, Zacatecas, *Dr. J. N. Rose*, 2 to 4 September, 1897, nos. 2751, 3649.

* * Heads usually numerous; pedicels and peduncles not greatly elongated, seldom exceeding 4 cm. in length. (Long peduncles or pedicels are occasionally found in *P. rude* and *P. pellitum*.)

+ Involucral scales acute or acuminate.

++ Leaves ovate, cordate, subcordate, or truncate at the base.

9. P. VERBESINOIDES, DC. Involucral scales ovate, acuminate, very unequal in length: rays about 10, linear-oblong. — Prodr. v. 608; Hemsl.

l. c. 182. — Mexico, *Berlandier*, acc. to DC. l. c. To this species we should refer Pringle's no. 6398 from hillsides about Cuernavaca, altitude 1,500 m. (a shrub 1.6 to 2.3 m. high); also an unnumbered specimen coll. by Bates in Mexico in 1846.

10. P. ASPERIFOLIUM, Sch. Bip. Involucral scales oblong-lanceolate, acute, not very unequal, coarsely pubescent: leaves tuberculate-pubescent and very scabrous above, copiously pubescent with softer hairs beneath: rays "about 16, oval." — Sch. Bip. in Klatt, Leopoldina, xxiii. 143. — Ejutla, Mexico, *Liebmann*, no. 568. Type in herb. Bot. Gard. Copenhagen; a fragment and good drawing in herb. Gray.

++ ++ Leaves lanceolate to lance-oblong, acute at the base.

11. **P. chalarolepis.** Shrub with slender quadrangular strigillose branches: leaves lanceolate, narrowly acuminate, 3-nerved from above the base, sharply serrate, finely pubescent and very scabrous upon both surfaces, 4 to 6 cm. long, a fourth as broad, scarcely paler beneath; petioles slender, 6 to 9 mm. long: heads many, small (6 mm. in diameter excl. of rays), borne in numerous open terminal 5-headed corymbs and not at all umbellate; involucral scales ovate, acuminate, with lax spreading tips, at length purplish: rays 6 to 9, oblong, 6 mm. long: anthers black. — Mountains of Chiapas, *Dr. Ghiesbreght*, 1864–1870, no. 563. Flowers in November. Type in herb. Gray.

12. **P. Ghiesbreghtii.** Shrub, 1 to 2 m. high: branches tetragonal, strigillose, soon glabrate: leaves lance-oblong, acute, serrate, 8 to 11 cm. long, 2 to 3 cm. broad, glabrate and smooth above, green and finely scabrous-pubescent beneath; petioles 5 mm. long: inflorescences (young) condensed and umbelliform: together forming a flat-topped corymb; involucral scales ovate, acute, minutely strigillose with white hairs: rays 7 to 8 mm. long. — Mountains of Chiapas, *Dr. Ghiesbreght*, 1864–1870, no. 576; also near San Cristobal in the same State, altitude 2,000 to 2,700 m., *E. W. Nelson*, no. 3205. Flowers in September and October. Type in herb. Gray.

+ + Involucral scales rounded or somewhat narrowed to an obtuse or obtusish tip.

++ Inner involucral scales 3 to 6 mm. long.

= Heads very small: involucre 3 mm. in diameter: scales ciliolate.

13. P. MICROCEPHALUM, Sch. Bip. Shrub: branches spreading, tetragonal, minutely strigillose, soon glabrate: leaves ovate-lanceolate, not exceeding 3 cm. in length, half as broad, slender-petioled, 3-nerved,

obscurely serrate, acute or acuminate: filiform pedicels 7 to 16 mm. long; heads numerous, in leafy-bracted corymbs, few-flowered: rays 5 to 8, oblong, 7 mm. long. — Sch. Bip. in Klatt, l. c. — Sta. Talca, *Liebmann*, no. 374; also near Totontepec, altitude 1,100 to 1,700 m., *E. W. Nelson*, no. 783. Type in herb. Bot. Gard. Copenhagen; a fragment in herb. Gray. Perhaps a form of the next.

14*. P. GRACILE, Hemsl. From description very like the last preceding but leaves said to be sometimes as much as 1 dm. in length (more than 3 times the size of any noted in *P. microcephalum*): pedicels 1.2 to 2.5 cm. long. — Biol. Cent.-Am. Bot. ii. 181. — San Cristobal, Orizaba, *Bourgeau*, no. 3206. Not seen by the writers. Type in herb. Kew.

= = Heads larger; involucral scales ciliate.

a. **Leaves green and scarcely paler beneath, scabrous-pubescent upon both surfaces.**

15. **P. Pringlei.** Shrub, scabrous throughout; branches and peduncles strigillose with minute appressed white hairs: leaves large (6 to 11 cm. long, 2 to 4 cm. broad), subentire to coarsely serrate-dentate, reticulate-veiny beneath; petioles 1 to 2 cm. long: pedicels filiform, subumbellate at the ends of the branches, 2 to 3 cm. long; involucral scales ovate to ovate-oblong: ligules about 8, pale yellow, 5 mm. long. — Slopes of cañons near Guadalajara, Jalisco, *C. G. Pringle*, 11 October, 1889, no. 2338 (distrib. as *P. Mendezii*?).

16. P. GYMNOLOMOIDES, DC. Shrub with tetragonal strigillose branchlets: leaves ovate-lanceolate, entire, attenuate, acute, rounded at the base, 5 cm. long, 1.5 to 1.7 cm. broad; petioles 3 mm. long: corymbs few(3–5)-headed; pubescence of the pedicels spreading; involucral scales broadly ovate, rounded at the ciliated summit: achenes narrowly or sometimes obsoletely winged, upwardly ciliated. — Prodr. v. 609; Klatt, Leopoldina, xx. 95. *Lipotriche gymnolomoides*, Less. Linnæa, vi. 408. — Mexico, Misantla, *Schiede & Deppe*, Mirador, *Sartorius*; Guatemala, in copses near Coban, Alta Vera Paz, *von Tuerckheim*, no. 339.

17. **P. rude.** Shrub, 1 to 2 m. high, scabrous throughout: leaves ovate, acutish, serrate, rounded or subcordate at the base, 2.5 to 3.7 cm. long, 1.5 to 2 cm. broad: heads corymbose or subumbellate by 3's or 5's at the summit of short or sometimes elongated peduncles; pubescence on pedicels strigose, appressed; involucral scales in 2 to 3 series, broadly ovate: ligules 8 to 10, oblong, bright orange, 7 to 9 mm. long — Hills of Oaxaca, at Las Sedas, *C. G. Pringle*, no. 4803 (distrib. as *P. gym-*

nolomoides), Huitzo, *L. C. Smith*, no. 218, Yalalag, *E. W. Nelson*, no. 954; also on the extinct volcano of Batea, *Guillemin-Tarayre*, and (?) rocky hills near Chihuahua, *Pringle*, no. 152 (distrib. as *P. parvifolium*).

b. Leaves ovate-oblong to lance-oblong, obscurely serrate to entire, distinctly paler and very finely pubescent or canescent-tomentulose beneath.

18. P. croceum. Copiously branched shrub; branchlets slender, tetragonal, scabrous: leaves ovate- to lance-oblong, acute to attenuate, 3-nerved, obsoletely serrate, rather abruptly narrowed at the base, 4 to 9 cm. long, 1.3 to 1.8 cm. broad, puberulent and scabrous above, very finely appressed-pubescent between as well as upon the veins beneath: heads numerous, showy, borne in the upper leaf-axils and subumbellate at the ends of the branches; pedicels 1.5 to 2 cm. long: involucral scales appressed, imbricated in 2 to 3 rows, unequal, the outer not only shorter but narrower, lanceolate, the inner ovate, rounded and ciliate at the summit: ligules about 7, oval, 8 to 10 mm. long, 6 mm. broad, yellow shading into deep orange towards the base. — State of Durango, *Dr. J. N. Rose*, no. 2321; also secured by the same collector between Pedro Paulo and San Blascito, Tepic, no. 1991. Types in herb. U. S. Nat. Museum and herb. Gray.

19. P. PELLITUM, Klatt. Leaves thinnish, ovate-lanceolate, attenuate, entire or nearly so, drying dark, the under surface covered with a very fine canescent tomentum: heads 3 to many at the ends of the branches; pedicels sometimes very short, sometimes much elongated. — Leopoldina, xxiii. 143. *P. discolor*, Sch. Bip. acc. to Klatt, l. c.; Hemsl. l. c., in part; not Schrad. — Mexico, Yavesia, *Liebmann*, no. 375; also mountains of Orizaba, *Thomas*, *Botteri*, no. 313, *Bourgeau*, no. 2927, *Seaton*, no. 125. Specimens from the Berlin Garden (1839) have elliptic obtuse crenate leaves.

20. P. DISCOLOR, Schrad. Shrub 3 to 5 m. high, very similar to the preceding species but with smaller thicker tomentulose leaves very rugose above, and not turning dark in drying: heads numerous; pedicels never much elongated. — Ind. Sem. Hort. Gotting. 1830; Linnæa, v. Lit.-Ber. 72; DC. Prodr. v. 608, excl. synon.; Hemsl. l. c. as to plants of Oaxaca. — Mountains and foothills of Oaxaca, *Andrieux*, no. 305, *Pringle*, no. 4650, *L. C. Smith*, nos. 129, 820.

= = = Heads as in the preceding group; involucral scales not ciliated.

a. Leaves linear-oblong, very small.

21. P. microphyllum. Shrub with slender terete smooth gray

opposite branches: leaves linear-oblong, entire, acute at each end, green on both sides, revolute at the margins, 3-nerved, thickish, scabrous, 1.4 to 1.7 cm. long, 2 to 4 mm. broad, puberulent under a lens: heads scattered, borne in the forks of the branches and terminally on short branchlets: pedicels about 7 mm. long, appressed gray-pubescent: scales of the involucre ovate, narrowed to an obtusish or sometimes expanded and obtuse tip: rays about 6, light yellow, oblong, 8 mm. in length. — Durango, Mexico, 13 August, 1897, *Dr. J. N. Rose*, no. 2252.

b. Leaves ovate.

22. P. Mendezii, DC. Shrub, scabrous: leaves ovate-lanceolate, short-petioled, serrulate or nearly entire: heads numerous, on erect stiffish fastigiate pedicels: involucral scales in about 3 rows, the outer ovate, the inner oblong: rays "3 to 4" to 8. — Prodr. v. 608; Hemsl. l. c. 182. — South Mexico at Villalpanda, *Mendez*. Type in herb. DC.; fragment in herb. Gray. To this species may be referred E. W. Nelson's no. 3433 from Chiapas, and Pringle's no. 7610 from Hidalgo.

Var. cylindrocephalum. Leaves lanceolate: involucre more cylindrical; scales in 4 rows. — Mountain side near Cuernavaca, Morelos, altitute 2,500 m., *C. G. Pringle*, 22 May, 1898, no. 7658. Type in herb. Gray.

++ Leaves and heads large, the latter rather crowded at the ends of the branches: inner scales of the involucre 8 to 12 mm. long.

= Pubescence on branches and petioles fine, appressed: petioles not over 1 cm. in length.

23. P. Berlandieri, DC. Leaves ovate, serrate or subentire, acute, rounded or scarcely cuneate at the base, 5 to 9 cm. long, obscurely pubescent: branchlets slender, nearly glabrous: rays 1 cm. long. — Prodr. v. 608; Hemsl. l. c. 181. — South Mexico, Guichilapa, *Berlandier*, no. 1040; also Valley of Mexico, *Bourgeau*, no. 964, and Mexico without locality, *Schmitz*.

24. P. Klattii. Tall shrub (4 m. high) with spreading branches; branchlets thickish, silky-pubescent with appressed hairs: leaves ovate-lanceolate, acuminate at each end, finely gray-pubescent on both surfaces, crenate-serrate or subentire, large for the genus, 1.5 to 1.9 dm. long, 6 to 7 cm. broad: scales of the large involucre very broad and rounded at the summit; rays 12, oblong-lanceolate, 1.8 cm. long. — *P. grande*. Klatt in Engl. Jahrb. viii. 43, not Hemsl. — On the Rio Risasalda, Cauca. U. S. Colombia, altitude 1,400 to 1,800 m., 24 November, 1883, *F. C. Lehmann*, no. 3282. Type in herb. Gray.

25. P. Nelsonii. Shrub with stout subterete branchlets, cinereous with copious short appressed or subappressed pubescence: leaves ovate, acuminate, serrate, thickish, finely scabrous-pubescent above, pubescent or almost tomentose beneath, rounded at the base, 6 to 10 cm. long, half as broad: heads large, showy, corymbose; pedicels subrigid, covered with grayish subappressed or strigillose pubescence; bracts linear; involucral scales oblong, rounded at the summit, ciliated: rays 8 or 10, oblong, orange-yellow, 1.5 cm. long. — Chiapas, Mexico, *E. W. Nelson* at two stations, namely, between San Cristobal and Teopisca, altitude 2,050 m. to 2,600 m., 4 December, 1895, no. 3465, and between Ocuilapa and Tuxtla, altitude 650 m. to 900 m., 29 August, 1895, no. 3076; also at Comitan, *C. & E. Seler*, no. 2970. Types in herb. Gray, herb. U. S. Nat. Museum, and herb. Berlin Museum.

= = Petioles 2 to 3 cm. long.

26. P. GRANDE, Hemsl. Shrub, hirsute throughout with spreading hairs: leaves ovate-oblong, crenate-serrate, nearly 2 dm. long, acuminate at the apex, acute but not attenuate at the base: rays 1.5 to 2 cm. long: involucral scales ovate, narrowed to an obtuse apex, pubescent and ciliate; heads numerous in an open corymb, showy: achenes frequently more or less winged. — Biol. Cent.-Am. Bot. ii. 181. *P. Tuerckheimii*, Klatt, Leopoldina, xx. 95. — Coban, Alta Vera Paz, Guatemala, altitude 1,300 m., *von Tuerckheim*, 1879 and 1886 (no. 336 of Mr. J. Donnell Smith's sets).

— **Var. strigillosa.** Habit and all technical characters of the species, but pubescence of the stem and pedicels minute, appressed, strigillose. — *Zexmenia fasciculata*, Coulter in J. Donnell Smith, Enum. Pl. Guat. pt. 4, 86, not Gray. — Cenanguilla, Depart. Santa Rosa, Guatemala, altitude 1,200 m., *Heyde & Lux*, no. 4244 of Mr. J. Donnell Smith's sets. Type in herb. Gray.

EXCLUDED SPECIES.

P. ALBUM, Wats. Proc. Am. Acad. XXV. 154, is *Calea scabrifolia*, Benth. & Hook. f.

The Peruvian plant of Matthews, mentioned by Bentham and Hooker (Gen. ii. 377) as probably of this genus, has alternate leaves, sterile ray-flowers, and other essential characters of a *Viguiera*.

ZALUZANIA, Pers. Heads (medium-sized) heterogamous with obvious rays or in one species homogamous and discoid. Involucre hemispherical; bracts 1–3-seriate, linear to ovate, appressed, subequal. Receptacle conical; pales conduplicate: ray-flowers uniseriate, few to many, styliferous and fertile, rarely wanting: disk-flowers regular, perfect, fertile; the tube usually slender and pubescent, tending to expansion over the summit of the achene; the subcylindric throat of about equal length; limb of 5 ovate or triangular acute teeth. Anthers unappendaged at the base. Style-branches obtuse or with a short acute appendage. Achenes of the disk-flowers somewhat flattened; pappus none; achenes of the ray-flowers 3-gonal, sometimes crowned with a few deciduous scales.— Syn. ii. 473 (1807); DC. Prodr. v. 553; Benth. & Hook. f. Gen. ii. 362; Hoffm. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 233. *Chiliophyllum*, DC. l. c. 554. *Hybridella*, Cass. Dict. xxii. 86. *Ferdinanda*, Lag. Elench. 31. *Chrysophania*, Kunth in Less. Syn. Comp. 224.— Twelve species extending from Arizona to South Mexico and (?)Central America.

Subg. 1. HYBRIDELLA. Palustrine perennial herbs: leaves 3–4-pinnatifid: disk globose, large, 1.2 to 1.6 cm. in diameter; pales very narrow: rays oblong-linear, yellow, numerous (20 to 30), irregularly bifid at the apex. — *Hybridella*, Cass. Bull. Soc. Philom. 1817, p. 12, & Dict. xxii. 86. *Chiliophyllum*, DC. Prodr. v. 554.

1. Z. GLOBOSA, Sch. Bip. Decumbent, hirsute: stems 3 dm. high, bearing 3 to 5 leaves and about 6 long-peduncled heads: radical leaves several, 1 to 1.5 dm. long, 4-pinnatifid, the ultimate lobes lance-linear, acute, 2.5 to 3.5 mm. long: cauline leaves similar, oblong in general contour, the margined petioles copiously ciliate or even lanate near the base: involucral scales lanceolate, acute. — Flora, 1861, p. 564; Hemsl. Biol. Cent.-Am. Bot. ii. 159, excl. pl. Hartw. and syn. in part. *Anthemis globosa*, Ort. Dec. 46; Jacq. Hort. Schoenb. iii. t. 372 (cited in text as 371). *Chiliophyllum globosum*, DC. Prodr. v. 554. — Swamps, low meadows, &c., San Luis Potosi, *Parry & Palmer*, no. 527; Valley of Mexico, *Bourgeau*, no. 385, *Schaffner*, no. 80, *Pringle*, nos. 2925, 3204; Mexico, without locality, *Bates*, *Schmitz*, no. 46.

2. Z. MYRIOPHYLLA, Sch. Bip. l. c. 565. Identical in habit, pubescence, and floral characters with the preceding: leaves also oblong in contour, the cauline about 4; ultimate segments very small (2 mm. long or less, and 0.8 to 1 mm. wide), rounded at the apex. — *Z. globosa*, Hemsl. l. c. in part. — Aguas Calientes, *Hartweg*, no. 111. Type num-

ber in herb. Gray. Notwithstanding the general similarity subsisting between this species and the preceding, the difference in the size and form of the ultimate leaf-segments is sufficiently marked to warrant at least varietal distinction, and in the absence of any evidence of intergradation it seems best to maintain the species as proposed by Schultz. Schaffner's no. 345 from San Luis Potosi appears to be a glabrescent form of this species.

3. Z. anthemidifolia. Nearly glabrous except on the younger parts: stems decumbent: radical leaves unknown, the cauline numerous (12 to 22, the lower successively caducous), ovate and acute in general contour, 2–3-pinnate; ultimate segments obtuse or obtusish: peduncles 2 to 5 cm. long (shorter than in the related species); involucral scales puberulent, obtuse or obtusish. — Wet sandy river banks, Guadalajara, Jalisco, *Pringle*, 23 September, 1891, no. 5156. Type in herb. Gray. With heads and habit of *Z. globosa*, but a smooth stem and numerous cauline leaves of quite different contour and lobing.

Subg. 2. FERDINANDA. Plants of drier habitat: disk 7 to 12 mm. in diameter: rays 5 to 12 or none. — *Ferdinanda*, Lag. Elench. 31.

* Rays present.

+ Leaves sinuate-lobed.

++ Annual or biennial, usually pale with copious canescent or sordid pubescence: rays about 8, short, 6 to 8 mm. in length.

4. Z. TRILOBA, Pers. Stems 3 to 7 dm. high, branched above, canescent-tomentulose to hirsutulous or granular: leaves sinuately bipinnatifid with angular segments: heads rather numerous in terminal corymbs. — Syn. ii. 473; DC. Prodr. v. 553; Hemsl. l. c. ii. 160, iv. 55; Wats. Proc. Am. Acad. xviii. 105. *Z. trilobata*, Hoffmgg. Verz. Pfl. Nachtr. ii. 231, acc. to Hook. f. & Jacks. Ind. Kew. ii. 1245. *Anthemis sinuata*, Llav. & Lex. Nov. Veg. Descr. i. 30. *A. triloba*, Ort. Dec. 72. — A distinct and readily recognized species, apparently common from Coahuila, throughout Central Mexico to Orizaba.

++ ++ Perennial, green and smoothish; rays about 10, 2 cm. or more in length.

5. Z. Grayana. Suffruticose, 6 to 8 dm. high, from a branched lignescent stock surmounting a thick woody root: leaves ovate, petiolate, 3-lobed; lobes rather broad, unequally toothed: involucral scales linear, acute, canescent-pubescent: ray-flowers styliferous and fertile, their achenes provided with a short irregular deciduous scale-pappus. — *Gymnolomia triloba*, Gray, Proc. Am. Acad. xvii. 217, & Syn. Fl. i. pt. 2,

269, 450, not *Z. triloba*, Pers. — Higher peaks of S. Arizona, south of Rucker Valley, *Lemmon*, coll. of 1881, in Huachuca Mts., *Lemmon*, coll. of 1882, *Pringle* (small-leaved form); also in Chihuahua in shaded ravines and slopes of mountains, *Pringle*, nos. 755, 1310. The fertile rays in this species necessitate its transfer to this genus, with which in fact it corresponds habitally quite as well as with *Gymnolomia*.

+ + Leaves crenate, serrate, or subentire, not lobed.

++ Leaves obtuse, pale above, canescent-tomentose beneath; blades rather abruptly contracted into winged petioles.

= Rays about 1 cm. long: involucral scales canescent-tomentose.

6. **Z. MOLLISSIMA**, Gray. Shrub: leaf-blade ovate, subentire: involucral scales (not very numerous) ovate-oblong, obtuse, white with permanent tomentum. — Proc. Am. Acad. xv. 35; Hemsl. Biol. Cent.-Am. Bot. ii. 160. — North Mexico, in fields near San Miguel, San Luis Potosi, *Schaffner*, no. 342; between San Antonio, Texas, and San Luis Potosi, *C. C. Parry*, nos. 35, 446; also on Mt. Orizaba, at 2,700 m. altitude, *Seaton*, no. 286.

= = Rays 5 to 7 mm. long: involucral scales puberulent, green.

7. **Z. AUGUSTA**, Sch. Bip. Shrub: leaf-blade ovate to lance-oblong, usually crenate: involucral scales numerous, lanceolate, the outer acute, subglabrate. — Flora, 1861, p. 562; Hemsl. l. c. 159 (excl. syn. *Z. megacephala*). *Ferdinanda augusta*, Lag. Gen. & Spec. Nov. 31, t. 2. *F. lutescens*, DC. Prodr. v. 553. *Anthemis lutescens*, Llav. & Lex. Nov. Veg. Descr. i. 30. *Chrysophania fastigiata*, Kunth, in Less. Syn. 224. — Apparently common in Central Mexico, near Guadelupe, *Bourgeau*, no. 803, *Bilimek*, no. 541; Chapultepec, *Bilimek*, no. 542; Rio Hondu Cañon, *Pringle*, no. 3144; Queretaro, *Berlandier*, no. 1254; near Guanajuato, *Dugès*.

++ ++ Leaves acute, deltoid-ovate or -lanceolate, abruptly contracted to winged petioles.

8. **Z. ASPERRIMA**, Sch. Bip. Stem terete, glabrate: blade of lower leaves dentate, of the upper subentire, 5 cm. long, 3 cm. broad: fastigiately branched corymbose panicle leafy-bracted: heads (exclusive of the rays) ovoid-conical, 7 to 9 mm. in diameter: rays 8 to 10, broadly oblong, 5 mm. long. — Flora, 1864, 218. — Chapulco, *Liebmann*, no. 544. Type number in herb. Gray.

Var. montagnæfolia. Blades of even the upper leaves conspicuously crenate-dentate. — *Z. montagnæfolia*, Sch. Bip. l. c. 1861, p. 563;

Klatt, Leopoldina, xxiii. 89. *Ferdinanda montagnæfolia*, Sch. Bip. in Koch, Berl. Allgem. Gartenz. 1858, 179. — S. Mexico, between Vera Cruz and Orizaba, *Müller*; Ocotla, *Liebmann*, no. 272; also in Oaxaca near Monte Alban, altitude 1,600 m., *Pringle*, no. 4928 (distrib. as *Z. asperrima*).

++ ++ ++ Leaves acute, elliptic- or rhombic-ovate; petioles short or none.

= Base of corolla-tube expanded over the rounded summit of the achene.

9. Z. MEGACEPHALA, Sch. Bip. Leaves rhombic-ovate, serrulate above the middle, narrowed into an entire cuneate petiole, acute at the apex: corymb many-headed: heads the size of a filbert. — Flora, 1861, p. 562. *Ferdinanda augusta*, var. *megacephala*, Sch. Bip. fide ipsi l. c. 563. — Near Real del Monte, *Ehrenberg*, acc. to Sch. Bip. The above brief compiled character comprises all distinctions as yet published of this plant. Dr. Gray referred to the species a specimen collected by Dr. Palmer in the Sierra Madre, south of Saltillo, Coahuila, no. 734. It has an erect subsimple leafy puberulent stem, ovate acute thinnish leaves, 7 to 10 cm. long, 4 to 8 cm. broad, canescent beneath, serrulate except near the base where cuneately narrowed to very short scarcely winged petioles (4 to 7 mm. in length): heads in an irregular corymb; involucral scales narrow, oblong, obtusish, canescent-puberulent: ligules about 9, 8 mm. long. Mr. Pringle has also secured specimens of the same plant near Carneros Pass, Coahuila, altitude 3,000 m., no. 2398 (distrib. as *Z. Coulteri*).

10. Z. COULTERI, Hemsl. Stems puberulent, purple, leafy, simple to the leafy-bracted corymb: leaves ovate, serrate, pubescent above, tomentose beneath, rounded at the base, slightly acuminate at the insertion of the short petiole: involucral scales ovate-oblong, soft-pubescent. — Biol. Cent.-Am. Bot. ii. 159, t. 46. — Real del Monte, *Coulter*, no. 350; also collected by *C. G. Pringle* on the Sierra de Pachuca, Hidalgo, altitude 2,700 m., 13 August, 1898, no. 6956. Type number in herb. Gray.

= = Base of corolla-tube not perceptibly expanded: achene margined at the summit.

11. Z. RESINOSA, Watson. Stoutish, pubescent: leaves rhombic-ovate, very large, 1.4 to 2.6 dm. long, 8 to 14 cm. broad, dentate, green on both sides, bearing minute resinous globules beneath: heads short-peduncled in a loose irregular corymb; involucral scales numerous, the outer ovate-lanceolate, acutish, tomentose, the inner broader, rounded at the summit, striate, glabrate. — Proc. Am. Acad. xxv. 153. — Cañons of

the Sierra Madre, near Monterey, Nuevo Leon, *Pringle*, nos. 2222, 2412. Type in herb. Gray. This species is reported by Mr. J. Donnell Smith (Intercont. Ry. Comm. i. pt. 2, append. 3, 12) as collected at Calel, Guatemala, but from the extraordinary extension of range we are forced to doubt the identity of the Guatemalan plant (which we have not seen) with the North Mexican species.

* * Rays none.

12. Z. DISCOIDEA, Gray. Stem simple, erect, 7 dm. high, canescent-tomentulose: leaves round-ovate, crenate-dentate, scarcely acute, pale green above, white-tomentose beneath, 9 cm. long, 8 cm. broad, truncate or subcordate at the base but cuneate at the insertion of the petiole (1 to 1.4 cm. long): heads numerous, small, in a dense almost naked terminal corymb. — Proc. Am. Acad. xxi. 388. — Rocky hills near Chihuahua, *Pringle*, no. 309; along road between Cerro Prieto and La Providencia, State of Durango, 11 September, 1898, *E. W. Nelson*, no. 4970. Type in herb. Gray.

II. — SYNOPSIS OF THE GENUS VERBESINA, WITH AN ANALYTICAL KEY TO THE SPECIES.

By B. L. ROBINSON and J. M. GREENMAN.

THE genus *Verbesina* has not been revised as a whole since its treatment in the fifth volume of the Prodromus (1836). In this work DeCandolle describes 33 species with definiteness and appends 8 more indefinitely as "non satis notæ." All but 2 of these 41 species were American. DeCandolle divides the genus into three sections: *Verbesinaria* with radiate heads and straight pappus-awns, *Hamulium* with radiate heads and uncinate awns, and *Platypteris* with discoid heads. In 1883, Dr. Gray (Proc. Am. Acad. xix. 11–15) synopsized the North American, West Indian, and Mexican forms known to him, adding to the sections *Ximenesia* with loose herbaceous involucre, and *Pterophyton*, including a part of DeCandolle's *Verbesinaria* and most of the obscurely distinguished genus *Actinomeris*. From 1883 to 1889, Dr. Klatt (Leopoldina, xx.–xxv.) characterized many species and sought to disentangle the synonymy. In the second volume of Hemsley's Biologia

Cent.-Am. Bot. are enumerated, with synonymy and citation of specimens, 30 named species known to grow in Mexico and Central America. So rapid, however, has been the recent exploration of the regions mentioned that this number is already more than doubled.

The genus is now generally conceded to be exclusively American, except so far as species have been introduced or naturalized in some parts of the Old World. Various obscure gerontogeous plants, early ascribed to *Verbesina* and enumerated in the Index Kewensis, are omitted from the following revision as they are with little doubt generically distinct.

The genus as here presented contains 109 species. More than 70% of these are local, and over 90% are confined to some one of the following regions.

S. E. United States (S. Car. to Fla. and Ala.) . . .	3 species.
Region of the Lower Rio Grande	2 "
Sonoran Region (W. Tex. to L. Calif. and N. W. Mex.)	16 "
Central and S. Mexico	44 "
Central America	9 "
N. South America (U. S. Colombia to Guiana) . . .	4 "
Brazil, Uruguay, Paraguay, Argentine Rep. . . .	11 "
Andean Region (Ecuador to Chili)	8 "
W. Indies	2 "

Verbesina, as a whole, reaches its highest specific diversity in the uplands of Central and Southern Mexico, where no less than 40% of its species are endemic. The genus is conveniently divided into 12 sections, of which *Hamulium*, *Platyptera*, *Stenocarpha*, *Alatipes*, *Pterophyton*, *Sonoricola*, *Ximenesia*, and *Pseudomontanoa* are obviously natural groups. Of these *Hamulium*, *Platyptera*, *Stenocarpha*, *Alatipes*, and *Sonoricola* are each composed of species of uniform or contiguous ranges. *Pseudomontanoa*, apparently unrepresented in Central America and W. Indies, is found in Mexico and Caribbean S. America. *Ximenesia* exhibits in the species *V. australis* a new instance of the interesting community of character between the flora of the Rio Grande region and that of extra-tropical S. America.

The sections *Verbesinaria*, *Saubinetia*, *Ochractinia*, and especially *Lipactinia*, must be regarded rather as provisional aggregates than natural or wholly satisfactory groups. In the general arrangement of the sections the sequence is from the large-headed to the small-headed forms. It may be noted that discoid heads occur only in *Platyptera* and

Lipactinia, and that roughly speaking the size of the plant is apt to be inversely proportionate to the size of the heads, i. e. the large-headed species are chiefly herbaceous, the medium-headed species fruticose, and the small-headed fruticose or arborescent, — a rule which, of course, has many exceptions. Annual species are known only in *Hamulium* and *Ximenesia*. The related genus *Actinomeris* is maintained, as by Dr. Gray, for the two typical species, which in their divergent pappus-awns and globose receptacles are sufficiently marked. The genus *Otopappus* cannot be distinguished solely upon the ear-like wing of the achene, but is readily recognized by its more paniculate (less corymbose) inflorescence and opposite oval attenuate undivided leaves, which are 3–5-nerved from near the base.

VERBESINA, L. (name a derivative of *Verbena*, applied because of some resemblance in foliage). — Heads radiate or discoid: ray-flowers when present usually styliferous and fertile but sometimes styliferous and sterile, and sometimes neutral: disk-flowers fertile. Involucre hemispherical or campanulate, sometimes much shorter than the disk-flowers; bracts imbricated in 2 to 6 series, ovate to lance-oblong or linear, seldom squarrose, the outer usually but not always shorter. Receptacle usually conical; pales concave, folded about the outer edge of the laterally compressed disk-achenes, sometimes squarrose in age. Corollas orange-yellow to cream-colored or white; rays short and scarcely exserted or more often long and showy; disk-corollas regular, with short tube, cylindrical throat and 5-toothed limb. Anthers unappendaged at the base. Style-tips acute or attenuate. Achenes glabrous or upwardly pubescent, sometimes tuberculate, strongly compressed laterally, usually oblong or obovate, winged on each edge. Pappus of 2 deciduous or persistent usually straight rarely hooked or obsolete awns. Herbs or shrubs (becoming arborescent in the tropics) with leaves serrate, dentate, or variously lobed, sometimes opposite, sometimes all or partly alternate, often of harsh texture and more or less scabrous, seldom glabrous, often decurrent. Heads small to large, numerous and corymbose to solitary on long terminal peduncles. Wings of the achenes white, chartaceo-cartilaginous.— Syst. Nat. (1735), & Spec. ii. 901, in part; DC. Prodr. v. 612; Benth. & Hook. f. Gen. ii. 379; Baillon, Hist. Pl. viii. 204; Gray, Proc. Am. Acad. xix. 11–15; Klatt, Leopoldina, xx. 92–94, xxiii. 143–144; Hoffmann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 238. Chief synonyms: *Ancistrophora*, Gray, Mem. Am. Acad. n. ser. vi. 457. *Hamulium*, Cass. Bull. Soc. Philom. 1820, p. 173. *Platypteris*, HBK. Nov. Gen.

& Spec. iv. 200. *Saubinetia*, Remy in Gay, Fl. Chil. iv. 282. *Ximenesia*, Cav. Ic. ii. 60, t. 178. For more complete generic synonymy see Hook. f. & Jacks. Ind. Kew. under *Verbesina* and *Actinomeris*.

§ 1. HAMULIUM, DC. l. c. 617. Awns of the pappus hooked at the summit. Heads subsolitary, radiate; ligules short, yellow, more or less biseriate. — *Hamulium*, Cass. l. c. & Dict. xx. 260. *Ancistrophora*, Gray, l. c. — Two species, chiefly West Indian.

* Acaulescent.

1. V. WRIGHTII, Griseb. Dwarf herb with radical spatulate leaves and naked scapose peduncles. — Cat. Pl. Cub. 155 (1866). *V. ancistrophora*, Gray, Proc. Am. Acad. xix. 14 (1883). *Hamulium Wrightii*, Sch. Bip. Bonplandia, ix. 365 (1861). — Cuba, *Wright*, no. 1317.

* * Caulescent: leaves alternate, decurrent.

2. V. ALATA, L. Spec. ii. 901. *Hamulium alatum*, Cass. l. c. 261. — Common and generally distributed in the West Indies. Said also to grow in Dutch Guiana and in Mexico, but not obtained in the latter country by recent collectors.

§ 2. PLATYPTERIS, DC. l. c. 617, in part (as to § 1). Heads discoid, large, subglobose. — *Platypteris*, HBK. Nov. Gen. & Spec. iv. 200. — Three species of S. Mexico and Central America with opposite leaves and winged stems.

* Bracts of the involucre of subequal length, the outer obovate or oblanceolate.

3. V. FRASERI, Hemsl. Biol. Cent.-Am. Bot. ii. 187. — Guatemala, Dueñas, *Fraser*, *Savin*, & *Godman*, acc. to Hemsl.; Depart. Santa Rosa, *Heyde* & *Lux*, no. 4236 of Mr. J. Donnell Smith's sets.

Var.* NELSONI, J. Donnell Smith, Bot. Gaz. xxiii. 9. — Near Neuton, Depart. Huehuetenango, Guatemala, *Nelson*, no. 3551. Said to have leaves lobed and heads smaller than in the typical form.

* * Involucral bracts narrow, oblong to linear, the outer much shorter.

+ Leaves ovate, serrulate.

4. V. OVATIFOLIA, Gray in Hemsl. l. c. 189, & Proc. Am. Acad. xix. 15. — Chiapas, Mexico, *Ghiesbreght*, no. 523.

+ + Leaves dentate or sinuately lobed.

5. V. CROCATA, Less. Syn. Comp. 232; DC. Prodr. v. 617; Hemsl. l. c. 187. *V. Fraseri*, Klatt, Bull. Soc. Bot. Belg. xxxi. 205, not Hemsl. *Bidens crocata*, Cav. Ic. i. 66, t. 99. *Spilanthes crocata*,

Sims, Bot. Mag. t. 1627. *Platypteris crocata*, HBK. l. c. 201. — Tepic, Santiago, *Lamb*, no. 548; Jalisco, in ravines near Guadalajara, *Palmer*, no. 700, *Pringle*, nos. 1796, 1807; Morelos, Cuernavaca, *Bourgeau*, no. 1770; between Huajuapam, Oaxaca, and Retlatzingo, Puebla, altitude 1,400 to 2,000 m., *E. W. Nelson*, no. 1991; Costa Rica, *Pittier*, nos. 4136, 4905.

§ 3. STENOCARPHA. Heads of medium size, globose: rays present, inconspicuous. Pales narrowly linear. Achenes papillose. Leaves opposite, sinuate-pinnatifid.

6. V. PLATYPTERA, Sch. Bip. in Klatt. Leopoldina, xxiii. 144 (1887), not Benth. & Hook. f. Gen. ii. 350 (in note), which, although earlier (1873), is a nomen nudum. — Mexico, Puerto de Sta. Cruz, *Liebmann*, no. 454.

§ 4. ALATIPES. Heads large, subglobose: rays present, pale yellow. Peduncles (except sometimes in *V. sphærocephala*) winged. Scales of the involucre ovate or broadly oblong, some or all rounded at the apex (occasionally involute and not showing at once their full breadth).

* Heads numerous, short-peduncled: leaves ovate, serrate, not lobed: wings of the stem narrow or obsolete.

7. V. SPHÆROCEPHALA, Gray. Woody at the base, 1 to 2 m. high. — Gray in Wats. Proc. Am. Acad. xxii. 428 (1887). — Mountains near Guanajuato, *Dugès*, no. 472: Jalisco, on hills near Guadalajara, *Palmer*, no. 448, *Pringle*, no. 1779; Colima at Manzanillo, *Palmer*, no. 1404.

* * Heads few: leaves dentate or lobed: stems and peduncles broadly winged.

+ Leaves rhombic-ovate to oblong, dentate but not lobed.

8. V. SCABRA, Benth. Pl. Hartw. 41. This species is reduced by Mr. Hemsley and by Dr. Gray to *V. tetraptera*, but from a drawing by Klatt and Bentham's brief characterization of the involucre we identify with the species Palmer's no. 377, from Tequila, Jalisco, which with its few broad herbaceous involucral scales is surely distinct from *V. tetraptera*. The type of *V. scabra* was collected by *Hartweg* at Zitaquaro in Eastern Michoacan.

+ + Leaves, at least the lower ones, sinuate-lobed and borne on a distinct though broadly winged petiole.

9. V. Klattii. *V. heterophylla*, Klatt, Arbeit. Bot. Mus. Hamb. 1892–93, p. 3 of reprint, not Gray. — Mountains near Patzcuaro, Michoacan, *Pringle*, no. 3983 (distrib. as *V. platyptera*?).

§ 5. PTEROPHYTON, Gray. Heads large or medium-sized, solitary or very few (rather numerous in *V. ovata*), mostly terminal on long peduncles. Rays present, yellow. Scales of the involucre narrower, oblong (broadly so in *V. Lindheimeri*) to linear. Pappus-awns short or obsolete, never longer than the breadth of the achene. Leaves opposite (except sometimes the uppermost), oblong and sessile or often rhombic-ovate upon cuneately winged petioles. — Proc. Am. Acad. xix. 12, & Syn. Fl. i. pt. 2, 287, in part. *Pterophyton*, Cass. Bull. Soc. Philom. 1818, p. 76, in part. — Herbaceous perennials of the Gulf States and Mexico.

* Peduncles winged to the heads: leaves opposite, rhombic to deltoid.

10. V. TETRAPTERA, Gray, Proc. Am. Acad. xix. 13 (1883). *Actinomeris tetraptera*, DC. Prodr. v. 575 (1836); Hemsl. l. c. 186 (excl. syn. *V. scabra*). *Helianthus tetrapterus*, Ort. Dec. vi. 74 (1798). *Coreopsis alata*, Cav. Ic. iii. 30, t. 260 (1794). — Mexico, San Luis Potosi, *Parry & Palmer*, no. 473½, *Schaffner*, no. 257; State of Mexico, *Bourgeau*, no. 604, *Pringle*, no. 3151; Oaxaca, *Conzatti & González*, nos. 399, 399ª, *Coulter*, no. 370.

* * Main axis broadly winged up into a compound 12–20-headed corymb: leaves alternate, oblong.

11. V. PTEROCAULA [Moc. & Sess.], DC. Prodr. v. 616 (1836); A. DC. Calques des Dess. t. 597. *V. ovata*, Gray, l. c. (1883). *V. tetraptera*, Klatt, Leopoldina, xx. 94, not Gray. *Coreopsis orata*, Cav. l. c. 41, t. 280 (1794). *Actinomeris ovata*, Nutt. Gen. ii. 181 (1818); Hemsl. l. c. 185. — S. Mexico, Real del Monte, *Coulter*, no. 363, *Ehrenberg*, no. 351; Mt. Orizaba, *Seaton*, no. 340.

* * * Peduncles long and wingless: heads solitary or few: stem winged below (except in *V. Schaffneri*, var. *exalata*).

+ Leaves oblong, green on both sides, sessile.

++ Rays yellow: Mexican.

12. V. Rosei. Erect herbaceous perennial, 3 to 6 dm. high, bright green and appearing glabrous, but under a lens strigillose: stems (narrowly or broadly winged up to the highest pair of leaves) 1 or more from a small lignescent stock with tough fibrous roots: leaves (3 to 4 pairs) opposite, oblong to oblong-lanceolate, acute or obtuse, serrulate, 5 to 9 cm. long, 1.5 to 2.5 cm. broad: peduncles 1 to 2, slender, 1–3-headed; bracts linear; pedicels long and slender; heads medium-sized 1 to 1.2 cm. broad exclusive of the rays; involucral scales 1–2-seriate, herbaceous, linear-

oblong, obtusish: ligules about 7, bright yellow, 1.7 cm. long: disk-achenes obovate, upwardly hispidulous; wings very narrow; awns two, short. — Tepic, on foothills between Acaponeta and Pedro Paulo, 2 August, 1897, *Dr. J. N. Rose*, no. 1948, and by the same collector between Pedro Paulo and San Blascito, 4 August, 1897, no. 3343. Types in herb. U. S. Nat. Museum and herb. Gray.

++ ++ Rays nearly white. Florida species.

13. V. HETEROPHYLLA, Gray, l. c. 12 (1883), & Syn. Fl. i. pt. 2, 288; Chapm. Fl. S. U. S. ed. 3, 255. *Actinomeris heterophylla*, Chapm. Bot. Gaz. iii. 6. — Low pine barrens, E. Florida, *Chapman*, *Palmer*, *Curtiss*, no. 1468[a], *Garber*.

+ + Leaves rhombic or deltoid with cuneate petiolar base.

++ Leaves densely canescent-tomentose beneath.

14. V. COULTERI, Gray. Leaves rhombic-oblong, finely toothed; blade not at all hastate or deltoid. — Proc. Am. Acad. xix. 13; Hemsl. l. c. iv. 57. *V. Capitaneja*, Hemsl. l. c. ii. 187, in part, not Nees. — S. Mexico, Zimapan, *Coulter*, nos. 341, 369.

++ ++ Leaves covered with slightly scabrous subappressed pubescence, pale green on both surfaces; blade subhastate or deltoid.

15. V. Schaffneri. Erect 1–several-stemmed perennial, slightly ligneous at the base: leaves about 3 pairs, opposite, the blade triangular, coarsely crenate-toothed, acutish or obtuse, contracted below into cuneate broadly winged entire petioles half their length; these decurrent upon the stem in herbaceous wings: peduncles long, terminal, terete, wingless, 1–2-headed; pedicels relatively short: bracts of the involucre 2–3-seriate, oblong, obtuse, canescent-pubescent about the margins: ligules about 12, oblong, deep yellow, 1.8 cm. long: achenes obovate, 7 mm. long, glabrous; body black, lucid; wings of medium breadth, thin, translucent. — Mexico, San Luis Potosi, in sandy ground near the city, September, 1876, *Schaffner*, nos. 258, 301, in part, *Parry* & *Palmer*, no. 473.

Var. exalata. Winged petioles subauriculate at the base not at all decurrent. — With the type at San Luis Potosi, *Schaffner*, no. 301 in part, also in "North Mexico," *Parry* (1878), no. 26½ in part.

++ ++ ++ Leaves (yellow-green) papillose-scabrous, rhombic-ovate, shallowly serrate-dentate.

16. V. CAPITANEJA, Nees, Linnæa, xix. 729 (1847); Hemsl. l. c. 187, in part (only as to pl. Bourgeau). ? *V. crocea*, Klotzsch in Klatt, l. c. 94 (nomen subnudum). *Actinomeris pedunculosa*, DC. Prodr. v.

576. — Valley of Mexico, Santa Fé, *Bourgeau*, no. 377, Tacubaya, *Schaffner*, no. 242; Durango, *E. W. Nelson*, no. 4600, *Palmer*, no. 318 (coll. of 1896).

* * * * Peduncles long and wingless; stems also wingless throughout.

← Species of Mexico and S. W. United States.

↔ Leaves chiefly opposite, very obtuse, narrowed to a distinct although winged petiole.

17. V. LONGIPES, Hemsl. Biol. Cent.-Am. Bot. ii. 188. — Mexico without locality, *Coulter*, no. 342. To this species we should refer Pringle's no. 3215, collected on rocky hillsides, San José Pass, State of San Luis Potosi, 22 July, 1890.

↔ ↔ Leaves chiefly alternate, the upper lanceolate, narrowed to an obtuse apex, sessile by a somewhat contracted but auriculate-clasping base: involucral bracts narrowly oblong.

18. V. Rothrockii. Stems erect, herbaceous, 6 dm. high, usually simple and 1-headed, terete, puberulent, scabrous, 1 to 4 from a thickish woody stock: leaves oblong-obovate, crenate-dentate from below the middle, green and scabrous-pubescent on both sides, 5 to 8 cm. long, half as broad, amplexicaul by two broad basal auricles: peduncles long, naked, terminal, rarely branched: heads 1.5 to 2 cm. broad exclusive of rays; involucral scales about 2-seriate, not very unequal, oblong, obtuse, hirtellous to strigillose, the inner somewhat erose-dentate: rays 8 to 12, orange-yellow, 1.5 to 2 cm. long: achenes 7 mm. long, broadly winged, glabrous; pappus obsolete. — *V. Wrightii*, Gray, Proc. Am. Acad. xix. 12, in part, & Syn. Fl. i. pt. 2, 287, in part. *Actinomeris Wrightii*, Gray, Pl. Wright, ii. 89, not of Pl. Fendl.; Rothrock in Wheeler, Rep. vi. 162, t. 8; Hemsl. Biol. Cent.-Am. Bot. ii. 186, excl. pl. Texas. — S. Arizona, Camp Bowie, *Dr. J. T. Rothrock*, no. 452, Ojo de Gavilan, *Thurber*, no. 1058, foothills of the Sta. Rita Mts., *Pringle;* Arizona without locality, *Lemmon;* New Mexico, between the Copper Mines and Conde's Camp, *Wright*, no. 1235; Coahuila, *Palmer*, nos. 585, 597, 598.

We take pleasure in dedicating this species to Dr. Rothrock, who (l. c.) first noted differences between this plant and the Texan species to which it has long been referred.

↔ ↔ ↔ Leaves subsessile by a cuneate exauriculate base; the upper oval: involucral bracts broadly oblong.

19. V. Lindheimeri. *V. Wrightii*, Gray, Proc. Am. Acad. xix. 12 (1883), in part, & Syn. Fl. i. pt. 2, 287, in part, not Griseb. (1866).

Actinomeris Wrightii, Gray, Pl. Fendl. 85. — Rocky places in woods, W. Texas, *Lindheimer*, nos. 37, 38, 643, *Wright*.

+ + Species of the S. E. United States.

++ Leaves coarsely serrate-dentate : rays very long.

20. V. NUDICAULIS, Gray, Proc. Am. Acad. xix. 12 (1883), & Syn. Fl. i. pt. 2, 288 ; Chapm. Fl. S. U. S. ed. 3, 255. *Helianthus? aristatus*, Ell. Sk. ii. 428. *Actinomeris nudicaulis*, Nutt. Trans. Am. Phil. Soc. vii. 364; Torr. & Gray, Fl. ii. 336. — Rich pine woods, Georgia, *Boykin ;* Alabama, *Buckley, Donnell Smith ;* Florida, *Chapman, Curtiss*, nos. 19, 5910, *Nash*, no. 2202.

++ ++ Leaves remotely serrulate or subentire : rays very short.

21. V. WAREI, Gray, ll. cc. *Actinomeris pauciflora*, Nutt. Am. Jour. Sci. v. 301, & Trans. Am. Phil. Soc. vii. 364. — Low pine barrens, W. Florida, *Ware, Chapman*.

§ 6. SONORICOLA. Heads large or medium-sized, seldom numerous: rays yellow, often pale; scales of the involucre narrowly to broadly oblong; awns of the pappus long and slender, at least when young much longer than the breadth of the achene: leaves opposite (at least below), ovate (lanceolate in *V. chihuahuensis*), not decurrent along the stem. Stems wingless, often ligneous. Species of the general Sonoran region forming a natural group.

* Body of the mature achenes 6 to 10 mm. long.

+ Leaves sessile.

22. V. DISSITA, Gray, Proc. Am. Acad. xx. 299.—Lower California, near Todos Santos Bay, *Orcutt*, no. 1233, and La Guilla, no. 1355.

+ + Leaves on broadly winged auriculate-clasping petioles : Lower Californian.

23. V. PALMERI, Wats. Proc. Am. Acad. xxiv. 56 (1889). — Mountain Cañons, Los Angeles Bay, Lower California, *Palmer*, no. 528.

+ + + Leaves on long narrowly winged exauriculate petioles : Mexican.

24. V. LEPTOCHÆTA, Gray, Proc. Am. Acad. xxi. 389 (1886). — S. W. Chihuahua, *Palmer*, no. 170.

* * Body of achenes 4 to 5 mm. long, glabrous ; wings broad, fringed.

25. V. EROSA, Brandegee, Proc. Calif. Acad. Sci. ser. 2, iii. 146 (1891). — Sierra de San Francisquito, Lower California, *Brandegee*.

* * * Body of the achenes 3 to 5 mm. long, upwardly pubescent; wings narrower.

– Bracts of the involucre not very unequal, 2–3-seriate, grayish green: Mexican.

26. V. CHIHUAHUENSIS, Gray, l. c. — Limestone ledges, Jimulco, Durango, and Carneros Pass, Coahuila, *Pringle*, nos. 121, 2782, and Sta. Eulalia Mts., Chihuahua, *Pringle*, no. 657; Durango, *Palmer*, no. 322 (coll. of 1896), a form with broader deltoid leaves.

– – Bracts of the involucre strongly unequal, 4–5-seriate, at length nigrescent: Lower Californian.

29. V. VENOSA, Greene, Bull. Torr. Club, ix. 110 (1882). *V. hastata*, Kellogg, acc. to Mrs. Curran, Bull. Calif. Acad. Sci. i. 140 (1885). *Encelia cedrosensis*, Rose, Contrib. U. S. Nat. Herb. i. 17 (achenes too young to show wings). — Cedros Island, off the coast of Lower California. *Palmer*, no. 741, *Anthony*, nos. 63, 296.

§ 7. XIMENESIA, Gray. Heads large; involucral bracts narrow, herbaceous, 2–3-seriate, subequal or the outer often more elongated and foliaceous: rays showy, yellow or orange, broad, deeply 3-toothed or -lobed at the apex: mostly annuals, always more or less canescent at least on the under surface of the coarsely toothed petiolate leaves. — Syn. Fl. i. pt. 2, 288. *Ximenesia*, Cav. Ic. ii. 60, t. 178; DC. Prodr. v. 627.

* Pales very narrow, almost filiform, persistent: petioles winged: rays short: apparently perennial.

28. V. nana. Dwarf, canescent-pubescent, branched from near the base; branches 1 to 1.5 dm. long, procumbent: leaves chiefly opposite, oval, obtuse or obtusish, irregularly and more often obtusely dentate, 3 to 5 cm. long, nearly half as broad, narrowed below to winged petioles; these entire or bearing two to four spreading teeth near the stem: peduncles solitary, terminal upon the branches: involucral bracts oblong to lance-linear, 8 mm. long, subequal: rays deep orange, seldom over 8 or 10 mm. in length: achenes suborbicular, broadly winged, villous; wings obtuse at the summit; pappus none. — *V. encelioides*, Gray, Syn. Fl. i. pt. 2, 228, in part. *Ximenesia encelioides*, a dwarf form, Gray, Pl. Wright. i. 112. *X. encelioides*, var. *nana*, Gray, Pl. Wright. ii. 92. — S. W. Texas, Laredo, *Berlandier*, nos. 1474, 214, *Wright*, coll. of 1851, Limpia, *Sutton Hayes*, no. 463; Coahuila, La Ventura, *E. W. Nelson*, no. 3918.

There has been an unfortunate confusion in the labelling or mounting of Wright's no. 1407, cited by Dr. Gray as the type of his var. *nana*. The plant mounted with the label no. 1407 (which shows evidences of erasure and change) is *V. encelioides*, var. *cana*, while the plant which Dr. Gray really described is undoubtedly the one here taken as *V. nana*.

* * Pales linear-oblong, entire or 2–3-toothed: annuals.

+– Achenes broadly winged from the summit to the base.

29. V. ENCELIOIDES, Benth. & Hook. f. Leaves appressed-pubescent but green above; petioles (at least of the upper leaves) provided on each side with a wing which broadens towards the base into a semi-ovate incised stem-clasping auricle: outer involucral scales long, green, much surpassing the disk: wings of the achene rather broad, acutish at the apex. — Benth. & Hook. f. acc. to Gray, Bot. Calif. i. 350; Gray, Syn. Fl. i. pt. 2, 288, in part. *Ximenesia encelioides*, Cav. l. c.; DC. l. c. — Florida, *Curtiss*, nos. 1503, 5650, *Palmer*, no. 291; Texas, *Heller*, no. 1785; Mexico, San Luis Potosi, *Parry* & *Palmer*, no. 468, State of Tamaulipas, Victoria, *E. W. Nelson*, no. 4425; Cuba, *Wright*, no. 3611. Naturalized in the warm parts of the Old World and cultivated in a broad-leaved form (*Ximenesia encelioides*, var. *hortensis*, DC. l. c.).

– **Var. cana.** More canescent throughout, even the upper surface of the leaves usually whitish with copious appressed pubescence: involucral bracts shorter, subequal. — *Ximenesia encelioides*, var. δ *cana*, DC. l. c.; Gray, Pl. Wright. ii. 92. — Texas, Laredo, *Berlandier*, nos. 2068, 2074; S. W. Texas, *Wright*, no. 352, *Palmer*, no. 617; New Mexico, *Fendler*, no. 421; Cuba, *Combs*, no. 577; Hawaiian Isls., *Hillebrand*.

— **Var. exauriculata.** Pale green annual: petioles entirely naked and slender or rarely the upper bearing a divaricate usually oblong subentire lobe on each side of the base: scales of the involucre subequal, scarcely or not at all surpassing the disk: wings of the achene broad, corky, obtuse at the apex. — *V. encelioides*, Gray, Syn. Fl. i. pt. 2, 288, in part; Hemsl. l. c. *Ximenesia encelioides*, Rothrock in Wheeler, Rep. vi. 163. — Kansas, *Hitchcock*, no. 277; Colorado, in the Arkansas Valley near Pueblo, *Greene*, Colorado Springs, *Miss Mulford*; Arizona, on the Little Colorado, *Sitgreaves Exp.*, *Thurber*, no. 667, *Rothrock*, no. 772, *Pringle*; Mexico, Coahuila, *Palmer*, no. 2064, Sonora, *Hartman*, no. 229, without locality, *Rose*, no. 3076.

+– +– Achenes narrowly winged or only winged near the summit.

30. V. AUSTRALIS, Baker in Mart. Fl. Bras. vi. pt. 3, 215. *Ximenesia microptera*, DC. l. c.; Hook. & Arn. in Hook. Jour. Bot. iii. 316; Griseb. Symb. Fl. Argent. 195. *X. australis*, Hook. & Arn. in DC. l. c. vii. 291. — South America, Buenos Ayres, *Bacle*; Concepcion del Uruguay, *Lorentz*; Central Paraguay, *Morong*, no. 98; Bolivian Plateau, *Bang*, no. 1003; also N. E. Mexico at Matamoras, *Berlandier*, no. 2286. From description we cannot separate *V. aurita*, Philippi, Ann. del. Mus. Nat. Chile, Bot. 1891, p. 48.

§ 8. VERBESINARIA, DC. Heads mostly numerous, medium-sized or large; involucral bracts lanceolate to linear-oblong: rays relatively long (1 to 2.5 cm.) and showy, yellow: leaves linear- to lance-oblong, or ovate, alternate (except in *V. hypoglauca*, *V. sororia*, *V. occidentalis*, and *V. elegans*), never lobed. — Prodr. v. 612, in part.

* Leaves narrow, linear to oblong, entire or remotely serrulate.

+ Outer bracts of the involucre of irregular length, some of them elongated and much surpassing the disk: stem wingless: leaves 1 to 2 dm. long.

31. V. LONGIFOLIA, Gray, Proc. Am. Acad. xix. 12 (1883), & Syn. Fl. i. pt. 2, 287. *Actinomeris longifolia*, Gray, Pl. Wright. ii. 89; Hemsl. Biol. Cent.-Am. Bot. ii. 185. — Mountains east of Santa Cruz, Sonora, *Wright*, no. 1234; Arizona, *Rothrock*, no. 608, *Pringle*, no. 327, *Lemmon;* Chihuahua, *Pringle*, no. 1286.

+ + Outer bracts of the involucre not surpassing the inner nor the disk.

++ Leaves soft-pubescent or tomentose beneath.

32. V. hypomalaca. Erect perennial herb, 4 to 6 dm. high: stems single or several, virgate, simple, terete, pubescent to hirsute, very leafy: leaves narrowly oblong to linear, obtuse or acute, obsoletely crenulate or serrulate (the margins tending to be revolute), 3 to 8 cm. long, 4 to 10 mm. broad, sessile by a cordate-auriculate base, pubescent and very scabrous above, canescent-tomentose beneath: heads 6 to 30, ovate or at length subconical, 1 cm. in diameter excluding the rays, borne on erect pubescent pedicels in a flat-topped corymb: involucral scales about 2-seriate, linear-oblong, obtusish, pubescent: ligules 15, about 1 cm. long. — *V. stricta*, Gray, Proc. Am. Acad. xix. 13, in part, & xxii. 427. *Actinomeris stricta*, Hemsl. l. c. 186, in part. — Orizaba, *Botteri*, no. 95, *Seaton*, no. 367; Rio Blanco, Jalisco, *Palmer*, no. 163; Cerro Ventoso above Pachua, Hidalgo, *Pringle*, no. 7611; Coahuila, *Palmer*, nos. 627, 628; Mexico without locality, *Coulter*, no. 362.

Var. hypochlora. Leaves yellowish green and soft-pubescent rather than tomentose beneath. — Hills of Patzcuaro, Michoacan, *Pringle*, no. 4136; near Monte Escobedo, Zacatecas, *Dr. J. N. Rose*, no. 2630. Types in herb. Gray and herb. U. S. Nat. Museum.

++ ++ Leaves glabrous or covered with a short sparse and scabrous pubescence beneath.

= Stem wingless: rays deep yellow.

33. V. STRICTA, Gray, l. c. xix. 13, in part. *Actinomeris stricta*, Hemsl. l. c. as to first named type. — San Luis Potosi, *Parry* & *Palmer*,

no. 461, *Schaffner*, no. 343; Durango, *Palmer*, no. 453, *E. W. Nelson*, no. 4564; Chihuahua, *Pringle*, nos. 1151, 1285; near Sta. Teresa, Tepic, *Rose*, no. 3397. This species differs from the preceding in its broader (oblong) less crowded leaves very different in pubescence and tending to be conduplicate along the midnerve. The range is also quite different.

= = Stems narrowly winged: rays pale yellow.

34. V. STENOPHYLLA, Greenm. Proc. Am. Acad. xxxii. 309. — Moist slopes above Cuernavaca, Morelos, altitude 2,000 m., *Pringle*, nos. 6503, 6668.

* * Leaves broader, lanceolate to ovate.

+ Leaves coarsely dentate: Mexican.

++ Leaves, at least in part, decurrent upon the stem.

35. V. COAHUILENSIS, Gray, l. c. 14; Hemsl. l. c. iv. 57. — Coahuila, 9.5 km. east of Saltillo, *Palmer*, nos. 584, 619; Nuevo Leon, mountains about Monterey, *Pringle*, no. 2870.

Var. viridior. Lower surface of the leaves green, scabrous-puberulent instead of canescent-tomentose as in the typical form. — Limestone ledges, Carneros Pass, Coahuila, 12 August, 20 September, 1890, *Pringle*, no. 3268. Type in herb. Gray.

++ ++ Leaves sessile and auricled, but never decurrent.

36. V. HYPOLEUCA, Gray, l. c. xv. 37, xix. 13; Hemsl. l. c. ii. 188. — San Luis Potosi, Mexico, *Parry & Palmer*, no. 474, *Schaffner*, no. 300.

+ + Leaves serrate or entire (serrate to coarsely dentate in the S. American *V. subcorduta*).

++ Perennial herbs or shrubs, with solitary heads and wingless stems: S. American.

= Achenes narrowly winged.

37*. V. ARNOTTII, Baker, l. c. 215. *V. helianthoides*, Hook. & Arn. in Hook. Jour. Bot. iii. 316, not Michx. *V. Hookerii*, Klatt, l. c. xx. 92. — Paraguay at Asuncion, *Gilbert*, no. 1043: Argentine Republic, Entre Rios, *Tweedie*.

= = Achenes broadly winged.

a. Leaves opposite.

38*. V. ASPILIOIDES, Griseb. Symb. Fl. Argent. 194. — Argentine Republic in Prov. Cordoba.

b. Leaves all alternate.

39*. V. VIGUIEROIDES, Baker, l. c. — Paraguay at Caaguasu, *Balansa*, no. 852a.

++ ++ Stems wingless: heads corymbose: South American shrubs.

= Scales of the involucre short, obtuse or obtusish, very unequal: leaves slender-petioled, not at all auricled.

40. V. GLABRATA, Hook. & Arn. in Hook. Jour. Bot. iii. 315; Baker l. c. 211. *V. helianthoides*, Gardn. in Hook. Lond. Jour. Bot. vii. 424, acc. to Baker, l. c. — Common in the woods of E. Brazil, *Martius*, no. 821, *Burchell*, no. 4593, *Sello*, nos. 863, 864, 1100, 1101.

= = Scales of the involucre about 2-seriate, not very unequal, obtuse to acute, canescent-tomentulose: wings of the achenes very narrow: petioles very short, narrowly wing-margined and subauriculate at the base or none; leaves canescent-tomentose beneath.

a. Andean.

41. V. ELEGANS, HBK. Nov. Gen. & Spec. iv. 204; Klatt, Leopoldina, xx. 93. — Andes of Ecuador, *Humboldt & Bonpland*, *Jameson*, *Couthouy*.

b. E. South American.

42. V. SUBCORDATA, DC. Prodr. v. 614 (where described as a shrub); ? Baker l. c. 213 (where described as a perennial herb). ? *V. auriculata*, Hook. & Arn. in Hook. Jour. Bot. iii. 315, not DC. — Uruguay and Argentine Republic.

= = = Scales of the involucre caudate-attenuate, very unequal, gray-villous: leaves sessile, subauriculate at the base.

43. V. Mandonii, SCH. BIP. in herb. Grayish-pubescent shrub with terete wingless branches: leaves alternate, ovate-lanceolate to lanceolate, acuminate to attenuate, subentire or repandly few-toothed, finely appressed-pubescent and somewhat scabrous above, soft-pubescent and paler but green beneath, pinnately veined, 6 to 15 cm. long, 1.5 to 3 cm. wide, narrowed (gradually or more abruptly) to a sessile sub-biauriculate base; the auricles slightly decurrent and tending to persist upon the stem after the fall of the leaf: corymbs about 12-headed, flat-topped, villous to tomentose; involucral scales 3–4-seriate, linear, acute to attenuate: rays about 14, oblong, light yellow, 1.2 cm. long, 4 mm. wide: achenes of the disk-flowers oblanceolate, attenuate at the base, narrowly and equally winged on both sides above, the wings extending upward on

the two short awns. — Linnæa, xxxiv. 528 (nomen nudum), & Bull. Soc. Bot. France, xii. 79 (nomen nudum); Britton, Bull. Torr. Club, xix. 150 (nomen subnudum); Rusby, Mem. Torr. Club, iii. no. 3, 60 (nomen nudum). — Andes of Bolivia, in woods, La Paz, altitude 2,600 to 3,700 m., January, 1861, *G. Mandon*, no. 57 in herb. Gray; October, 1895, *Rusby*, no. 1721; 1889, *Bang*, no. 4.

++ ++ ++ Stem wingless: leaves opposite at least below: heads corymbose: **Mexican species.**

= Leaves large, gray-pubescent beneath: achenes with broad fimbriate wings.

44. V. SORORIA, Gray, Proc. Am. Acad. xv. 37; Hemsl. l. c. 190. — San Luis Potosi, *Parry & Palmer*, no. 466.

= = Leaves smaller, lanceolate, white beneath: achenes very narrowly winged.

45. V. HYPOGLAUCA, Sch. Bip. An attractive shrub, 3 to 5 m. high, with habit of the following species. — Sch. Bip. in Klatt, Leopoldina, xxiii. 144 (1887). — S. Mexico, Cumbre de Acalcingo, *Liebmann*, no. 485; Oaxaca on the Sierra de San Felipe, altitude 3,000 m., *Pringle*, no. 6041.

++ ++ ++ ++ Stem (at least on the upper part of the internode) bearing narrow, soon corky wings: leaves alternate: achenes very narrowly margined: fruticose. **S. Mexican species.**

= Leaves whitened beneath by an extremely fine and close pubescence: pedicels short, glabrous.

46. V. NERIIFOLIA, Hemsl. l. c. 188. — Chiapas, *Ghiesbreght*, no. 528, *Nelson*, no. 3466. Type number in herb. Gray.

= = Leaves loosely canescent-tomentose beneath: pedicels longer and more slender, pubescent with spreading hairs.

47. V. OAXACANA, DC. Prodr. v. 614, not Klatt, l. c. xxiii. 144. — Mountains of Oaxaca, *Andrieux*, no. 301, acc. to DC. l. c. To this species may be referred L. C. Smith's nos. 877 and 895, coll. at San Juan del Estado at 1,800 m. altitude.

= = = Leaves slightly paler but green beneath: pedicels puberulent to tomentulose.

48. V. LIEBMANNII, Sch. Bip. in Klatt, l. c. xxiii. 144 (1887). *V. variabilis*, Rob. & Greenm. Proc. Am. Acad. xxxii. 47 (1896). — S. Mexico, Cumbre de Estepa, *Liebmann*, no. 538; mountains of Oaxaca, *E. W. Nelson*, no. 1393, *Pringle*, no. 4918, *Conzatti*, no. 31; and a doubtful specimen from Guerrero, *E. W. Nelson*, no. 2215.

++ ++ ++ ++ ++ Stem mostly provided with narrow or broad herbaceous wings: tall herbaceous species of the United States.

= Wings of the achene very narrow or obsolete: leaves ovate, opposite: heads rather small and few-flowered.

49. V. OCCIDENTALIS, Walt. Fl. Car. 213 (1788); Gray, Syn. Fl. i. pt. 2, 287, q. v. for rather extensive synonymy. — Woods, etc., Pennsylvania to Florida "and Illinois" (doubted).

= = Wings of the achene broad: leaves chiefly alternate: heads rather large, numerously flowered: rays long.

50. V. HELIANTHOIDES, Michx. Fl. ii. 135; Gray, Syn. Fl. i. pt. 2, 288. *Actinomeris helianthoides*, Nutt. Gen. ii. 181; DC. Prodr. v. 575, vii. 290, incl. formal vars. *Nuttallii* and *Elliottii*. *?A. oppositifolia*, DC. l. c. vii. 290 (opposite-leaved form). — Open woods, etc., Ohio to Iowa, Georgia, and Texas; common.

§ 9. SAUBINETIA (*Saubinetia*, Remy in Gay, Fl. Chil. iv. 284, extended). Heads as in the last or smaller: rays present, yellow (rather pale in *V. boliviana*, of uncertain color in *V. guatemalensis*), short, little exserted: leaves oblong or ovate to lanceolate, not lobed (except sometimes in *V. boliviana*).

* Stem wingless: leaves sessile and biauriculate or borne on winged biauriculate petioles; auricles (narrow and sometimes obscure in *V. orcopola*) herbaceous, continuous with the blade, neither deciduous nor decurrent.

+ Leaves ovate or ovate-lanceolate, narrowed to winged auriculate petioles: S. American.

51. V. BOLIVIANA, Klatt, Ann. Naturh. Hofmus. Wien, ix. 361 (1894). *V. Bridgesii*, Rusby, Mem. Torr. Club, iv. 212 (1895). — Andes of Bolivia, *Cuming*, near Cochabamba, *Bang*, no. 974. Rays pale yellow.

+ + Leaves oblong, sessile, more or less auriculate or amplexicaul: Mexican.

++ Leaves green and glabrous beneath.

52. V. NELSONII, Rob. & Greenm. Proc. Am. Acad. xxxii. 46. — Mountains of Guerrero between Ayusinapa and Petatlan, altitude 1,500 to 2,100 m., 14 December, 1894, *E. W. Nelson*, no. 2118. Types in herb. Gray and herb. U. S. Nat. Museum.

++ ++ Leaves pubescent to canescent-tomentose beneath.

= Involucral scales lanceolate, acuminate.

53. V. POTOSINA, Rob. Proc. Am. Acad. xxvii. 175. — San Luis Potosi, mesas at Hacienda de Angostura, *Pringle*, no. 5113.

= = Involucral scales oblong, obtusish.

a. Rays 7 to 8 mm. long.

54. V. **oreopola.** Shrub with short internodes and pale buff cortex: branchlets pubescent with fine white soft sub-appressed hairs: leaves narrowly lance-oblong, subentire or remotely serrulate, attenuate at the apex, narrowed to a sessile somewhat biauriculate base, green, puberulent, and slightly scabrous above, canescent-tomentose or merely pubescent and scarcely paler beneath, 5 to 15 cm. long, 1 to 2.5 cm. broad: heads (7 to 10 mm. in diameter exclusive of rays) 14 to 20 in a compound flat-topped corymb: rays 10 to 12, oblong, yellow: bracts of the inflorescence linear-oblong, acute; involucral scales oblong, obtusish, soft-pubescent and ciliate; chaff stramineous, abruptly contracted to a straight erect mucro: body of the achene black, puberulent, obovate; wings relatively broad, divergent at the summit; awns of the pappus 2, slender, two thirds as long as the body of the achene. — Collected in mountains about San Luis Potosi, August, 1876, *Schaffner*, no. 344; *Parry & Palmer*, no. 457 (1878). Incorrectly referred to *V. persicifolia* and *V. salicifolia* (= *V. virgata*).

b. Rays broadly oblong, 3-dentate, 3 mm. long.

55. V. **guatemalensis.** Stems striate, wingless, alternately branched, sparingly pubescent: leaves alternate, lance-oblong, acute, subentire, glabrate and bullate above, somewhat paler and canescent with fine close appressed pubescence beneath, 7 to 10 cm. long, 1 to 2 cm. broad, narrowed below to a biauriculate subamplexicaul base, not decurrent upon the stem: inflorescence at first loosely but above fastigiately much-branched, sordid-pubescent: heads numerous, in fruit 7 to 9 mm. in diameter: rays very short, 3-dentate, little exserted, probably yellow: achenes obovate, broadly and equally winged; wings rounded at the apex; body 5 mm. long, tuberculate especially along the prominent midnerve: pappus-awns 2, long, slender, equal. — *V. virginica*, Coulter in Donnell Smith, Enum. Pl. Guat. pt. 4, 88, not L. — Palin, Depart. Amatitlan, Guatemala, altitude 1,100 m., February, 1892, *J. Donnell Smith*, no. 2860.

* * Leaves more or less decurrent upon the stem.

– Involucral scales narrow, linear: pales villous near the summit.

– – Leaves sparsely pubescent or at length glabrate beneath: Central American.

56. V. PALLENS, Benth. in Oersted, Vidensk. Meddel. 1852, p. 97; Hemsl. l. c. 189. — Nicaragua, on the western slopes of the volcano El Viejo, *Oersted.*

++ ++ Leaves permanently sordid-tomentose beneath: Bolivian.

57. **V. Soratæ**, Sch. Bip. ined. Branches terete, pubescent, narrowly and irregularly winged by the decurrent bases of the winged petioles: leaves alternate, ovate, acuminate, crenate-serrulate, rugose, scabrous-tomentose above, paler and soft sordid-tomentose beneath, 6 to 10 cm. long, 2.5 to 5 cm. broad, pinnately veined, rather abruptly narrowed to a winged and somewhat crisped petiolar portion (1 to 2.5 cm. long): corymbs much branched; branches and pedicels covered with loose sordid woolly pubescence; involucre campanulate, 7 mm. in diameter: rays about 10, oblong, pale yellow?, 7 mm. long: achenes of the disk-flowers (immature) linear, attenuate below; pappus of 2 unequal slender awns. — Linnæa, xxxiv. 528, & Bull. Soc. Bot. France, xii. 79; Britton, Bull. Torr. Club, xix. 150 (all mere mentions). — Sorata, Bolivia, *Mandon*, no. 55, and in the same locality at 2,400 m. altitude, February, 1886, *Dr. H. H. Rusby*, no. 1722.

+ + Involucral scales obovate-oblong, rounded at the apex: pales villous at the summit: Chilian.

58. **V. Saubinetia**, Klatt, l. c. xx. 92. *Saubinetia helianthoides*, Remy in Gay Fl. Chil. iv. 284, t. 49. — Near Coquimbo, Chili.

+ + + Involucral scales broad, ovate: pales glabrous or nearly so.

++ Involucral scales acute: leaves acuminate, tomentulose beneath, alternate.

59. **V. acapulcensis.** Stem tomentulose, partially winged by the cuneate decurrent herbaceous bases of the leaves: leaves alternate, ovate, cuspidate-denticulate, acuminate at each end, green, scabrous, and lepidote above, paler and sordid-tomentulose beneath, 1 to 1.8 dm. long, 2.5 to 7.5 cm. broad, pinnately veined; petioles relatively short, winged; heads 35 to 40, short-pedicelled in a rather dense leafless corymb, subglobose, 1.2 to 1.8 cm. in diameter; involucral bracts 2-seriate, ovate, acute, scarcely herbaceous, somewhat stramineous, striate, ciliate: rays about 10, oblong, scarcely exserted: achenes of the disk-flowers about 4 mm. long, narrowly to rather broadly winged, often tuberculate above; awns subequal. — Vicinity of Acapulco, Mexico, *Dr. Edward Palmer*, no. 162 (coll. of 1894–1895). Type in herb. Gray.

++ ++ Involucral scales obtuse: leaves obtuse, barely puberulent beneath, opposite, the uppermost alternate.

60. **V. xanthochlora.** Herbage yellowish green: stem canescent-puberulent, narrowly winged by the green decurrent bases of the leaves; these mostly opposite, ovate-oblong, obtuse, subentire or denticulate, green and concolorous on both sides, appressed-puberulent under a lens:

heads 1 to 1.5 cm. in diameter, subglobose, very short-pedicelled in a loose leafy corymb; pedicels canescent-tomentose; scales of the involucre herbaceous, suborbicular, obtuse or rounded at the apex, tomentulose: ligules about 10, bright yellow, oblong, little exserted: achenes of the disk-flowers oblanceolate, attenuate below, narrowly winged, 6 mm. long, tipped with 2 (to 3) short subequal awns. — Atlixco, Puebla, Mexico, *E. W. Nelson*, 25 July to 1 August, 1893, without number. Type in herb. Gray and herb. U. S. Nat. Museum.

* * * Leaves (silky-tomentose beneath) not decurrent, but stem with herbaceous wings.

61. V. MOLLIS, HBK. Nov. Gen. & Spec. iv. 203; DC. Prodr. v. 617; Hemsl. l. c. 188; Klatt, l. c. xx. 94 (where identity of *V. sericea* is suggested). *V. sericea*, Kunth & Bouché, Ind. Sem. Hort. Berol. 1848, 14; Walp. Ann. ii. 867; Hemsl. l. c. 190. — S. Mexico, originally coll. between Guanajuato and Villalpando by *Humboldt & Bonpland*, mountains of Oaxaca, *Galeotti*, no. 2002, *Pringle*, no. 4863, *E. W. Nelson*, no. 1782, *Conzatti & González*, no. 400.

* * * * Leaves tomentulose beneath, bearing at the base of the short petiole one or two small thickish auricles which soon become corky and fall off: stem wingless: tips of the pales straight.

62. V. ONCOPHORA, Robinson & Seaton, Proc. Am. Acad. xxviii. 109. *V. virgata*, var.? *conyzoides*, DC. Prodr. v. 616; A. DC. Calques des Dess. t. 596. *V. conyzoides*, [Moc. & Sess. acc. to] DC. l. c. (1837), not Trew (1769). — State of Mexico, *Bourgeau*, no. 967, *Pringle*, no. 4310.

* * * * * Leaves smoothish beneath: stem usually provided with narrow soon corky wings or ridges more or less decurrent from the short petioles: tips of the pales recurved.

63. V. VIRGATA, Cav. Shrub 1 to 3 m. high. — Ic. iii. 38, t. 275. *V. salicifolia*, HBK. l. c. 205, although described as herbaceous, is with scarcely a doubt a synonym, as suggested by Hemsl. Biol. Cent.-Am. Bot. ii. 190. *V. persicifolia*, Klatt, Leopoldina, xx. 93, not DC. — Valley of Mexico, *Bourgeau*, no. 963, *Schmitz*, no. 52, *Schaffner*, no. 6; mountains of Oaxaca, *Pringle*, no. 4946, *E. W. Nelson*, no. 1380, *Conzatti*, no. 714; near Plateado, Zacatecas, *Rose*, no. 2753.

* * * * * * Leaves not auricled at the base: stem not winged.

– Leaves opposite, coarsely dentate.

64. V. SERRATA, Cav. Leaves ovate, finely pubescent above, cinereous-pubescent beneath: pales shorter than or not greatly exceeding the

achenes. — Ic. iii. 7, t. 214; DC. l. c. 613; Hemsl. l. c. 190; Klatt, l. c. 92, but "angustissime alatis" can apply only to the very young achenes. —Mexico, Guanajuato, *Humboldt & Bonpland, Dugès*, no. 469; Aguas Calientes, *Hartweg*, no. 115; Michoacan, *Pringle*, no. 4114; Hidalgo, *Pringle*, no. 6537; Monte de San Juan del Rio, *Berlandier*, no. 1289.

— Var. Pringlei. Leaves ovate-oblong, coarsely and irregularly serrate, papillose-scabrous above, pubescent and subcinereous beneath: pales long, recurved, considerably exceeding the mature achenes. — *V. Pringlei*, Robinson, Proc. Am. Acad. xxvii. 175. — Barrancas near Guadalajara, Jalisco, *Pringle*, no. 3845.

— Var. amphichlora. Leaves lance-ovate, finely appressed-pubescent and bright green upon both surfaces. — Collected between Ramos and Inde, Durango, Mexico, *E. W. Nelson*, 11–14 August, 1898, no. 4680. Types in herb. Gray and herb. U. S. Nat. Museum.

+ + Leaves opposite, serrulate.

++ Leaves green and sparingly pubescent beneath: involucral scales obtuse.

65. V. RESINOSA, Klatt, Leopoldina, xxiii. 144. — S. Mexico, Yavesia, *Liebmann*, no. 331. Type in herb. Bot. Gard. Copenhagen; fragments and a good sketch in herb. Gray.

++ ++ Leaves pale, tomentulose, and prominently reticulated beneath: involucral scales acute.

66. V. GRAYI, Benth. & Hook. f. acc. to Hemsl. l. c. 188. *Zexmenia Grayii*, Sch. Bip. in Seem. Bot. Herald, 305. — North Mexico, Sierra Madre, *Seemann*, no. 2004.

++ ++ ++ Leaves canescent-tomentose beneath without prominent reticulation: involucral scales acute to acuminate.

67. V. molinaria. Branches terete, canescent with an almost microscopic appressed pubescence: leaves opposite, oblong-lanceolate, acuminate at each end, serrulate, pinnately veined, pale green and slightly scabrous-puberulent above, canescent and silky-tomentose beneath, 1.2 to 1.4 dm. long, 3 to 3.7 cm. broad; petioles 7 mm. long: heads corymbose, 8 to 10 mm. in diameter; involucral scales about 2-seriate, oblong, acute: rays about 6, oblong, yellow, 4 mm. long, half as broad; the tubular portion pubescent: pales oblong, subtruncate, apiculate: achenes of the disk-flowers 2 to 3 mm. long, puberulent, moderately winged on both edges: pappus of two short awns. — *V. oncophora*? Greenm. Proc. Am. Acad. xxxii. 309. — Under bluffs of a barranca above Cuernavaca, Morelos, altitude 2,000 m., 1 November, 1896, *C. G. Pringle*, no. 6600. The specific name is suggested by its dusty appearance. Type in herb. Gray.

+ + + Leaves alternate or scattered.

+ Fruiting heads about 1 to 1.5 cm. in diameter.

= Leaves not lepidote above.

a. Scales of the involucre 8 to 10 mm. long: achene with a single small earlike wing in the manner of *Otopappus*, or with two very unequal wings: Mexican.

68. V. Robinsonii, FERNALD in herb. *Otopappus alternifolius*, Robinson, Proc. Am. Acad. xxvi. 165 (1891); *O. Robinsonii*, Klatt, Ann. Naturh. Hofmus. Wien, ix. 362 (1894).— Limestone hills, San José Pass, San Luis Potosi, *Pringle*, no. 3310. While this species possesses the typical pappus of *Otopappus*, its habit, and as we now believe its genetic relationship, are nearer to *Verbesina*. The original specific name, *alternifolius*, being preoccupied under *Verbesina*, the species is transferred under the next name. To this species may be referred, with some doubt, *V. Humboldtii*, Klatt, Leopoldina, xx. 92 (as to pl. Mex.), not Spreng. *V. Humboldtii*, Spreng. (*V. helianthoides*, HBK. Nov. Gen. & Spec. iv. 204), is supposed to be Ecuadorian and is described by Kunth as having leaves glabrous above, which is not the case here.

b. Scales of the involucre about 1 cm. long: Bolivian.

69. V. CINEREA, Rusby, Mem. Torr. Club, vi. 63. — Near Cochabamba, Bolivia, *Bang*, no. 1092.

c. Scales of the involucre about 7 mm. long: E. South American.

70. V. SORDESCENS, DC. Prodr. v. 613; Baker in Mart. Fl. Bras. vi. pt. 3, 214, and var. *semiserrata* (=*V. semiserrata*, Sch. Bip. in herb. acc. to) Baker, l. c. — Brazil, *Riedel*, and others; Central Paraguay, *Morong*, no. 628a.

d. Scales of the involucre 4 to 6 mm. long: wings of the achenes usually subequal: leaves serrate or serrulate: Mexican.

1. Leaves green and closely appressed-puberulent (not scabrous) beneath.

71. V. chiapensis. Branchlets striate, appressed-puberulent, at length glabrate and smooth; internodes rather long: leaves lance-oblong, mucronulate-serrulate, attenuate at each end, subglabrous above, scarcely paler and finely appressed-puberulent beneath, pinnately veined, becoming 2 dm. long, 6 cm. broad: corymb 20–30-headed, 1.5 dm. broad; heads 1.2 cm. in diameter excluding the linear-oblong spreading deep yellow rays (8 mm. in length); pedicels slender, 1 to 4 cm. long, covered with short but copious somewhat spreading pubescence; scales of the involucre sub-uniseriate, ovate-oblong, acutish, 3 to 4 mm. long, much

exceeded by the flowers of the at length subglobose disk: achenes (young) obovate, 2 mm. long, puberulent; wings equal but ear-like, confined to the upper part of the achene and more or less adnate to the two pappus awns, these nearly as long as the body of the achene. — Chiapas, Mexico. near Tumbala, altitude 1,200 to 1,700 m., *E. W. Nelson*, no. 3364. Types in herb. Gray and herb. U. S. Nat. Museum.

2. Leaves grayish-tomentulose (not scabrous) beneath: pedicels slender: Mexican.

72. V. **cinerascens.** Branches downy with soft spreading pubescence, terete, pithy: leaves alternate, lance-oblong, attenuate at both ends, remotely serrate, puberulent and scabrous above, grayish-tomentulose beneath, pinnately veined, 1 to 1.3 dm. long, 3 cm. broad: corymbs compound, fastigiate, about 40-headed; pedicels tomentulose, 3 cm. long, erect, the middle one abbreviated; ovate-oblong involucral scales acutish, pubescent, 4 mm. long: flowers pale yellow: rays about 10, narrowly oblong, 8 mm. in length: achenes of the disk-flowers narrowly and somewhat unequally winged; the body 2.5 mm. long, upwardly puberulent. — On cool wooded slopes of a barranca near Guadalajara, Jalisco, 20 November, 1888, *C. G. Pringle*, no. 1806 (distributed as *V. salicifolia*). Type in herb. Gray.

3. Leaves tomentulose at least on the veins beneath, green and at length decidedly scabrous on both surfaces: scales of involucre broadly ovate; pedicels short and thick.

73. V. **crassipes.** Shrub with terete wingless dark purple scabrous-tomentose branches: leaves alternate, obovate-lanceolate, serrate, acute, sessile by a cuneate neither auriculate nor decurrent base, papillose and very scabrous above, green, tomentulose (at least on the nerves and pinnate veins) and at length scabrous beneath, 6 to 9 cm. long, a third as broad, the margins tending to be revolute: corymbs dense, many-headed; pedicels thick, mostly very short: fruiting heads depressed-globose, 1.5 cm. in diameter: involucral scales ovate-oblong to obovate, finely appressed-pubescent, the outer obtuse, thickened below, the inner acute, somewhat stramineous; pales broad, ovate, acute, stramineous, somewhat ciliate above: rays about 10, linear-oblong, 8 to 9 mm. long: achenes of the disk-flowers, 3 to 4 mm. long, oblong, narrowly and subequally winged; awns 2, slender, subequal. — Oaxaca, Cañada Sta. Maria, 8 December, 1895, *C. & E. Seler*, no. 1476, also by the same collectors in the district of Nochistlan, 14 December, 1895, no. 1590. Types in herb. Gray and herb. Berlin Museum.

4. Leaves white and silvery beneath with appressed microscopic hairs.

74. **V. hypargyrea.** Shrub or tree with leafy, at first cinereous-puberulent, at length glabrate and warty branches: leaves (smaller than in the related species) lanceolate, attenuate at each end, serrate, conspicuously discolorous, green and microscopically puberulent above, silvery-white beneath, pinnately veined, with somewhat prominent reticulation beneath, 8 to 11 cm. long, 1.5 to 2 cm. broad: heads subglobose, numerous, in compound corymbs; pedicels cinereous-puberulent, 6 to 12 mm. long; pales stramineous, tipped by an erect mucro: achenes of the disk-flowers 2 mm. long, glabrous, narrowly and about equally winged, the wings continuous upon the subequal pappus-awns. — Chiapas, between Hacienda Juncana and San Vicente, altitude 1,300 to 1,800 m., 12 December, 1895, *E. W. Nelson*, no. 3510.

e. Inner scales of the involucre about 5 mm. long: leaves coarsely dentate: S. American.

75. V.? DENTATA, HBK. Nov. Gen. & Spec. iv. 205. *Pallasia dentata*, H. & B. Pl. Æq. ii. 101, t. 111. — Ecuador, between Penipe and Rio Bamba, *Humboldt & Bonpland;* Ecuadorian Andes, *Spruce*, no. 5792. The achenes of this species seem to be somewhat 4-angled, and the pappus-awns are very unequal.

= = Leaves (at least in age) distinctly lepidote-maculate above with round white dots (bases of fallen trichomes).

a. Lower surface of the leaves sordid-pubescent: involucre campanulate: wings of the achene broad, equal.

76. V. DONNELL-SMITHII, Coulter, Bot. Gaz. xx. 50, & in Donnell Smith, Enum. Pl. Guat. pt. 4, 88. *Encelia pleistocephala*, J. Donnell Smith, Bot. Gaz. xiii. 189, & Enum. Pl. Guat. pt. 1, 22. — Guatemala, Coban, Depart. Alta Verapaz, altitude 1,300 m., *von Tuerckheim*, no. 1121 of Mr. J. Donnell Smith's sets; San Miguel Uspantán, Depart. Quiché, altitude 1,800 m., *Heyde & Lux*, no. 3385 of Mr. J. Donnell Smith's sets. Type number in herb. Gray.

b. Lower surface of the leaves essentially glabrous from the first: involucre soon saucer-shaped or reflexed.

77. V. PERSICIFOLIA, DC. l. c. 614; Gray, Proc. Am. Acad. v. 183 (*persicæfolia*); Hemsl. l. c. 189; ? Klatt, l. c. xxiii. 144, but not of Klatt, l. c. xx. 93, which is *V. virgata*, Cav. — Between Santander and Victoria, N. E. Mexico, *Berlandier*, nos. 2209, 789, San Luis Potosi, *Pringle*, no. 3078; Wartenberg, Huasteca, *Ervendberg*, nos. 84, 91.

c. Lower surface of the leaves sordid-pubescent on the veins beneath: involucre saucer-shaped or at length reflexed by the enlargement of the globose head: W. Indian.

78. V. LEPROSA, Klatt, Leopoldina, xx. 93. — Morne Rouge, Martinique, *Hahn*, no. 1214.

d. Lower surface of the leaves tawny-tomentose: involucre as in the preceding: wings of the achenes variable in the same head and often very unequal and adnate to the pappus-awn in manner of *Otopappus*: Mexican.

79. V. OLIVACEA, Klatt, l. c. 93. *V. oaxacana*, Klatt, l. c. xxiii. 144, not DC. *Otopappus olivaceus*, and *O. oaxacanus*, Klatt, Ann. Naturh. Hofmus. Wien, ix. 362. — S. Mexico, Hacienda de la Laguna, *Schiede*, no. 340; Mirador, at Consaquitla, *Liebmann*, no. 540 (*V. leprosa*, Klatt, Leopoldina, xxiii. 143, not l. c. xx. 93; also the undescribed *V. Sartorii*, Sch. Bip. acc. to Klatt, l. c. xxiii. 143), and at Trapiche de la Concepcion, *Liebmann*, no. 543 (by clerical error cited as no. 614 by Klatt, l. c.).

++ ++ Heads somewhat smaller, in fruit 7 to 9 mm. in diameter.

= Tips of the pales recurved.

80. V. SEEMANNII, Sch. Bip. in Seem. Bot. Herald, 306; Hemsl. l. c. 190. — N. W. Mexico, Sierra Madre, *Seemann*, no. 2027 (with well developed pappus); S. W. Chihuahua, *Palmer*, no. 324 (with pappus reduced).

= = Tips of the pales straight.

a. Heads 14 to 25 in a rather small corymb often surpassed by the leaves: cortex of the branches gray, soon glabrate: pedicels tomentose with spreading hairs.

81. V. ABSCONDITA, Klatt, Leopoldina, xx. 93. — Mexico, without locality, *Ehrenberg*, no. 837. Although characterized as being an herb and as having 5-piloso-costate achenes, this species proves (from a detailed drawing by Klatt) to be the plant formerly described by us as *V. Smithii*, Proc. Am. Acad. xxxii. 46, and its range may be more definitely given as follows: Jaycatlan, Oaxaca, altitude 1,300 m., *L. C. Smith*, no. 132; limestone ledges, near Tehuacan, Puebla, *Pringle*, no. 7497.

b. Branches not lanate: heads very numerous in broad corymbs; pedicels silky-canescent with subappressed hairs.

82. V. PERYMENIOIDES, Sch. Bip. in Klatt, l. c. xxiii. 143. — S. Mexico, Yavesia, *Liebmann*, no. 330; Oaxaca, *C. & E. Seler*, no. 33, *Pringle*, no. 4804; *L. C. Smith*, nos. 216, 295, 898 (smoothish form); *E. W. Nelson*, no. 1507.

c. Heads numerous: branches lanate.

1. Tips of the involucral scales squarrose: rays 7 to 8 mm. long: leaves remotely incurved-dentate, 3 to 5 cm. broad.

83. V. Oerstediana, Benth. in Oersted, Vidensk. Meddel. 1852, p. 96; Klatt, l. c. xxiii. 144. — Costa Rica, on the side of the Volcano Irasu, altitude 2,000 to 2,500 m., *Oersted, Pittier*, no. 11583.

2. Tips of the involucral scales appressed: rays 1.1 cm. long: leaves essentially entire, 6 to 10 cm. broad.

84. **V. lanata.** Stem stout, pithy, terete, woolly: leaves elliptic-lanceolate, obsoletely denticulate, pubescent upon both surfaces, 1.5 to 2.5 dm. long, 6 to 10 cm. broad, rather abruptly narrowed to a caudate acumination at the apex, gradually narrowed below to a wingless woolly petiole 4 cm. in length: branches of the compound flat-topped many-headed corymbs sordid-lanate or -tomentose; involucre turbinate, about 4-seriate, sordid-tomentulose; scales oblong, obtusish: rays about 10, elliptic-oblong, 6 mm. long, white (?); awns of the pappus long and slender. — *V. Oerstediana*, Donnell Smith, Enum. Pl. Guat. pt. 1, 23, not Benth. — Guatemala, Coban, Depart. Alta Verapaz, *H. von Tuerckheim*, February, 1888, no. 1344 of Mr. J. Donnell Smith's sets.

§ 10. Pseudomontanoa. Heads small: rays yellow: leaves sinuately 3–5-lobed: pales broad.

* Leaves alternate.

85. **V. fastigiata.** Tomentulose, younger parts more or less white-woolly: stems with rather broad herbaceous wings: leaves alternate, palmately 3-lobed, slightly scabrous above, loosely canescent-tomentose beneath, 3-nerved from above the base, 8 to 20 cm. long, 5 to 14 cm. broad, decurrent into winged petioles; nerves prominent beneath: heads numerous, in anthesis 5 mm. in diameter, in fruit 1 to 1.2 cm. in diameter, subglobose, in compound flat-topped fastigiate corymbs; scales of the involucre about 3-seriate, unequal, narrowly ovate, acute, appressed-pubescent and ciliate; pales stramineous, acute, with an erect tip: rays small, pale yellow: achenes broadly winged, pale in color, broadly obovate, the body 3 mm. long; pappus of 2 unequal awns. — Mexico, without locality, *Dr. J. Gregg*, 1848–1849, no. 575.

* * Leaves opposite.

– Stems broadly winged: outer involucral bracts minute, ovate, acute, somewhat decurrent upon the puberulent pedicels; these subumbellate, 1 to 3 cm. long: Mexican.

86. V. pinnatifida, Cav. Ic. i. 67, t. 100; DC. Prodr. v. 615; Hemsl. l. c. ii. 190, excl. synon. and pl. Oersted. — Cuernavaca, More-

los, *Bourgeau*, no. 1210; near Guadalajara, Jalisco, *Palmer*, no. 698, *Pringle*, no. 1797; Sinaloa, *Lamb*, no. 463, immature.

+ + Stems narrowly winged: outer bracts of the involucre two thirds as long as the inner, oblong, obtuse; pedicels tomentose, 2 to 8 mm. long: Mexican.

87. V. montanoifolia. Stems terete, narrowly 4-winged; internodes long: leaves opposite, sinuately and pinnately 3(–5)-lobed, 8 to 16 cm. long, 8 to 13 cm. broad, scabrous above, green and densely pubescent beneath with short stiff spreading hairs; lobes ovate, denticulate not incised: corymbs compound, the primary branches long, but the ultimate tomentose pedicels considerably shorter than in the preceding species: involucral scales 2-seriate, green, 4 to 6 mm. long: rays 8 to 10, bright yellow, 6 mm. long: body of the disk-achene oblanceolate, 4 mm. long, glabrous; wings about equal, rather broad, rounded at the summit; awns 2, long, subequal. — Ravines, Patzcuaro, Michoacan, 11 November, 1890, *C. G. Pringle*, no. 3475.

+ + + Stems with rather narrow wings: pedicels 4 to rarely 16 mm. long, covered with a sordid pubescence: S. American.

83. V. caracasana. Shrub 2 to 3 m. high: branches sparingly scabrous-pubescent; wings 4, herbaceous, 1 to 2 mm. in breadth, straight (not crisped as in *V. pinnatifida*): leaves opposite, sinuately 3-lobed, very scabrous and white-punctate above, somewhat paler but green and sordid-pubescent beneath, rather thin, 8 to 16 cm. long, 6 to 11 cm. broad: lobes acute or acuminate, mucronulate-serrulate to dentate, neither lobed nor incised: corymbs ample, at first fastigiate, at length loose: pedicels slender, more or less flexuous, sordid-pubescent; involucre in anthesis cylindrical, 5 mm. in breadth; scales 3–4-seriate, narrowly oblong, acutish, pubescent: rays 6 to 8, little exserted: fruiting heads 1.5 cm. in diameter: achenes broadly obcordate; the body oblong, cuneate at the base, 4 mm. long, somewhat tuberculate; wings broad; awns 2, nearly as long as the achene. — Caracas, *Birschel*, December, 1854; also near Tovar, Venezuela, 1854–1855, at 1,200 m. altitude, *A. Fendler*, no. 693.

+ + + + Stems wingless: Mexican.

89. V. TRILOBATA, Rob. & Greenm. Proc. Am. Acad. xxxii. 46. — Rocky gulches, Monte Alban, Oaxaca, *Pringle*, no. 4875.

§ 11. OCHRACTINIA. Heads small: rays white or nearly so: leaves alternate.

* Herbs of the United States, Mexico, and Fernando do Noronha.

+ Wings of the stem 4 to 5, narrow, seldom attaining the inflorescence: pappus well developed.

90. V. VIRGINICA, L. Spec. ii. 901; DC. Prodr. v. 616. *V. polycephala*, DC. l. c. — Highly variable as to foliage, but without significant or constant technical differences.

α (typical form). Leaves undulate-dentate to entire, not lobed, soft-pubescent beneath: rays about 6 mm. long. — Illinois to Georgia and Texas, common. Ervendberg's no. 58 from Huasteca, S. Mexico, is placed here with doubt.

Var. β LACINIATA, Gray. Leaves sinuately lobed: rays as in the typical form. — Syn. Fl. i. pt. 2, 287. *V. laciniata*, Nutt. Gen. ii. 170. *V. sinuata*, Ell. Sk. ii. 411; DC. l. c. 615. — S. Carolina, *Dr. Mellichamp*, to Florida, near the coast.

Var. γ **insularis.** Leaves lobed or undivided: rays short, 3 to 4 mm. long, otherwise closely like the typical form. — Fernando do Noronha, *Ridley, Lea, & Romage*, 1887. Type in herb. Gray.

+ + Wings of the stem commonly 6, usually penetrating the inflorescence: leaves mostly sinuate-dentate or deeply crenate: pubescence very short: pappus well developed, half to two thirds as long as the achene: S. W. United States and adj. Mexico.

91. V. MICROPTERA, DC. l. c. 616. — Between Laredo and Bejar, *Berlandier*, nos. 182, 1442; on the Rio Grande near Blancos, *Schott*; Guadelupe, *Palmer*, no. 732 (coll. of 1880); Nuevo Leon, *Berlandier*, June, 1844; Matamoras, *Gregg*.

Var. **mollissima.** Leaves velvety with dense somewhat tawny tomentum beneath. — Valley near Monterey, Nuevo Leon, 7 July, 1888, *C. G. Pringle*, no. 1916, also in Nuevo Leon, *Berlandier*, June, 1843, and on the Rio Coleto, Texas, September, 1850, *G. Thurber*, no. 8.

+ + + Wings of the stem 5 or 6: pappus abortive, scarcely exceeding the narrow wing: outer involucral scales spatulate with an herbaceous tip.

92. V. **rumicifolia.** Stems thick, herbaceous, pithy, finely pubescent, broadly 5(–6?)-winged: leaves alternate, elliptic-lanceolate, large, 1.5 to 2 dm. long, 4 to 8 cm. broad, sharply and doubly sinuate-dentate, acute, narrowed below to a sessile and decurrent base, thin, green and sparsely pubescent on both surfaces; the upper leaves subentire, oblong, elongated, obtuse, crisped on the margins: branches of the corymbose panicle winged; pedicels sordid-villous; heads larger and more numerously flowered than in *V. virginica;* involucral scales canescent-villous,

the outer somewhat spatulate with herbaceous often recurved tips: achenes obovate, glabrous, black and shining, 5 mm. in length, narrowly winged; awns of the pappus very short (0.2 to 0.5 mm. in length). —*V. virginica*, var. *Palmeri*, Gray, acc. to Wats. Proc. Am. Acad. xviii. 106, & xix. 11 (where first described); Hemsl. l. c. iv. 57. — Soledad, Coahuila, Mexico, *Dr. Edw. Palmer*, no. 733 (coll. of 1880). Type in herb. Gray.

* * Trees, shrubs, and gigantic half-shrubs of South Mexico, Central and South America.

+ Leaves broadly lanceolate, very large (7 to 22 cm. in breadth), undivided.

93. V. punctata. Stems pale gray, pithy, terete, smooth: leaves alternate, ovate to ovate-lanceolate; the blade 2 to 3 dm. long, 7 to 22 cm. broad, serrate-dentate, slightly scabrous and white-punctate above, green, scarcely paler, veiny and sparsely pubescent beneath, acute, narrowed or abruptly contracted below into a winged petiole: branches of the compound many-headed corymb winged; pedicels filiform, 8 to 14 mm. long; involucre campanulate, 5 to 6 mm. in diameter; scales 3-seriate, ovate, acuminate, ciliolate, otherwise glabrous, the outer much shorter: rays about 8, white, short-oblong: achenes of the disk-flowers (immature) narrowly winged; pappus-awns long and slender. —*V. leprosa*, Coulter in Donnell Smith, Enum. Pl. Guat. pt. 4, 88, not Klatt. — Guatemala, Casillas, and Las Viñas, Depart. Sta. Rosa, *Heyde & Lux*, nos. 4241 and 6176 of Mr. J. Donnell Smith's sets.

+ + Leaves lance-oblong, undivided, 2 to 4 cm. broad, glabrate and very smooth above.

94. V. ACUMINATA, DC. l. c. 614. Shrub or small tree, 2 to 5 m. high, exuding a viscid milky juice: leaves varying from entire to serrate. —*V. Moritziana*, Sch. Bip. acc. to Klatt, Leopoldina, xx. 93. *V. salicifolia*, Klatt, l. c. not HBK. — Caracas, *Vargas*, *Moritz*, no. 832; Tovar, Venezuela, *Fendler*, no. 2352; U. S. Colombia, *Moritz*, no. 833.

+ + + Leaves sinuate-lobed or -pinnatifid occasionally subentire in *V. verbascifolia*.

++ Stems wingless above, soon glabrate and very smooth: leaves deeply pinnatifid, lobes 5 to 11, relatively narrow.

95. V. GIGANTEA, Jacq. Branches wingless. — Ic. Pl. Rar. i. t. 175 & Coll. i. 53; DC. l. c. 615. *V. myriocephala*, Sch. Bip. in Klatt, l. c. xxiii. 144. — Chiapas, near Yajalon, *E. W. Nelson*, no. 3423; St. Augustin, S. Mexico, *Liebmann*, no. 271; Guatemala, Palin and St. Luis, *J. Donnell Smith*, nos. 2861, 2378; Panama, *Seemann*; Jamaica, *Wolf*; Martinique, *Hahn*; Magdalena, U. S. Colombia, *André*, no. 222.

++ ++ Stems winged even to the inflorescence.

= Leaves deeply 9–13-lobed; lobes oblong, acuminate, not very unequal, serrulate.

96. V. PINNATA, Clark acc. to DC. l. c. — Country unknown. Ghiesbreght's no. 782 from Chiapas, Mexico, corresponds well with the description as to foliage, winged stem, etc., but has the stem glabrate as in *V. gigantea*, of which it is probably only a winged form.

= = Leaves deeply 3–9-lobed; lobes oblong, acuminate, not very unequal, serrulate.

97. V. DIVERSIFOLIA, DC. l. c.; Baker in Mart. Fl. Bras. vi. pt. 3, 213, t. 65. ? Britton, Bull. Torr. Club, xix. 150. — Bahia, Brazil, *Blanchet & Salzmann;* and probably Coripati, Yungas, Bolivia, *Bang*, no. 2135 (stem winged?). A portion of the type material in herb. Gray. Leaves said to vary to an unlobed form.

= = = Leaves irregularly and seldom deeply lobed, rarely undivided; lobes broad, often obtuse; veins at length very prominent beneath.

98. V. TURBACENSIS, HBK. l. c. iv. 203; DC. l. c.; Klatt, Leopoldina, xx. 93. *V. verbascifolia*, Walp. Bot. Zeit. ix. 63 (wrongly referred to the opposite leaved *V. pinnatifida* by Klatt, l. c.). *V. nicaraguensis* & *V. microcephala*, Benth. in Oersted, Vidensk. Meddel. 1852, p. 97–98; Klatt, Bull. Soc. Bot. Belg. xxxi. 206. *V. pinnatifida*, Hemsl. l. c. 190, in part. — S. Mexico, Oaxaca, *Pringle*, no. 4966, *L. C. Smith*, no. 288, *E. W. Nelson*, no. 1852; Lobani, *Liebmann*, no. 333; Orizaba, *Bourgeau*, no. 3208, *Schaffner;* Costa Rica, *Tonduz*, no. 7247; Guatemala, *von Tuerckheim*, no. 1351 of Mr. J. Donnell Smith's sets; Turbaco, U. S. Colombia, *Humboldt & Bonpland;* Tovar, Venezuela, *Fendler*, no. 698; Caracas, *Moritz*, no. 60 (leaves undivided). This species was originally described as having yellow flowers, but this is probably an error. The otherwise excellent description of Kunth and a detailed drawing by Klatt are well matched by the white-flowered plants placed here.

++ ++ ++ Stems wingless, permanently pubescent or tomentose.

99. V. SUBLOBATA, Benth. Pl. Hartw. 76; Hemsl. l. c. 190; Klatt, Leopoldina, xxiii. 144. *V. gigantea*, Coulter in Donnell Smith, Enum. Pl. Guat. pt. 4, 88, not Jacq. — Chiapas, *E. W. Nelson*, no. 3468; Guatemala, *Hartweg*, no. 536, *Salvin* (acc. to Hemsl.), *Heyde & Lux*, no. 4238 of Mr. J. Donnell Smith's sets; "Costa Rica & Guatemala," *Warscewicz*, no. 127. *V. tomentosa*, DC. l. c. 614, is a doubtful synonym.

§ 12. LIPACTINIA. Rays none: heads small.

* Leaves (at least in great part) opposite.

+ Erect shrub: leaves serrate, pubescent: Mexican.

100. V. PAUCIFLORA, Hemsl. Biol. Cent.-Am. Bot. ii. 189 (1881). *V. cymosa*, Gray, Proc. Am. Acad. xxi. 390 (1886). — Cerro de Pinal, *Seemann*, no. 1468; S. W. Chihuahua, *Palmer*, no. 135.

+ + Perennial herb: leaves serrate, scabrous: S. American.

101*. V. GRISEBACHII, Baker, l. c. 214. *V. helianthoides*, Griseb. Symb. Fl. Argent. 194, not Michx. — Argentine Republic, Entre Rios, to Concepcion del Uruguay (acc. to Baker, l. c.).

* * Leaves alternate, bipinnatifid: Brazilian.

102*. V. BIPINNATIFIDA, Baker, l. c. 213. — Minas Geraës, Brazil, *Martius*.

* * * Leaves alternate, undivided, auriculate at the base: Mexican.

103. V. AURICULATA, DC. Prodr. v. 617; Klatt, Leopoldina, xxiii. 144. — Tehuantepec, *Andrieux*, no. 302; Villa Alta, *Liebmann*, no. 211.

* * * * Leaves alternate, undivided, exauriculate.

+ Leaves very large, 1.5 to 3 dm. long, 4 to 8 cm. broad.

++ Brazilian.

= Achenes broadly winged.

104*. V. FLORIBUNDA, Gardner in Hook. Lond. Jour. Bot. vii. 407; Baker, l. c. 212. — Minas Geraës, *Gardner*, no. 4927.

= = Achenes narrowly winged.

105*. V. NICOTIANÆFOLIA, Baker, l. c. — Brazil without locality, *Pohl*, no. 621.

++ ++ Andean.

106. V. ARBOREA, HBK. l. c. 202; DC. l. c. 617. *V. Cumingii*, Sch. Bip. Linnæa, xxxiv. 528. — Mountains about Quito, *Humboldt & Bonpland*; near Sorata, Bolivia, *Mandon*, no. 56.

+ + Leaves smaller.

++ Leaves sparingly pubescent beneath.

= Leaves "sessile": heads numerous.

107*. V. GUIANENSIS, Baker, l. c. 211. — British Guiana, *Schomburgk*, nos. 194, 654. — Not seen by the writers.

= = Leaves narrowed below to distinct petioles: corymbs few-headed.

108. V. Schomburgkii, Sch. Bip. in Schomb. Faun. Fl. Brit. Guiana, 1078 (name only); Klatt, l. c. xx. 94. — British Guiana, *Schomburgk*, no. 993. A form of the preceding?

++ ++ Leaves densely pubescent beneath.

109. V. Clausseni, Sch. Bip. in Baker, l. c. 212. — Central Brazil, *Claussen, Riedel, Warming, Langsdorf.*

Doubtful Species.

V.? æstuans, Lam. Dict. iii. 262, DC. Prodr. v. 618 (*Inula æstuans*, L. Spec. ed. 2, ii. 1236), known from Plum. ed. Burm. t. 41, f. 2, is wholly doubtful and probably not of this genus. It has very numerous long narrow linear rays and a multiseriate involucre.

V. argentea, Bertol. Fl. Guat. 435, if (as described) with neutral ray-flowers and triangular upwardly villous achenes, is probably an *Encelia*.

V. argentea, Gaud. in Freyc. Voy. Bot. 463, is a very imperfectly characterized plant of the Marian Islands.

V. conyzoides, Trew, Pl. Rar. 8, t. 6 (1763), without locality, does not appear to have been recognized by any subsequent author. We have not had access to the work in which it is figured.

V. decurrens, Vell. Fl. Flum. viii. t. 114, represented with racemose heads and a pappus of several capillary bristles, is surely not of this genus.

V. Humboldtii, Spreng. Syst. iii. 577. *V. helianthoides*, HBK. Nov. Gen. & Spec. iv. 204, not Michx. We have seen no material of this species and are unable to place it satisfactorily. It is supposed to come from Ecuador, and is probably related to *V. elegans*, but has leaves "glabrous above." The Mexican plants referred to this species by Klatt are doubtless distinct.

V.? ilicifolia, Poir. Dict. viii. 459, of San Domingo, with opposite short-petiolate coriaceous dentate leaves, is still doubtful.

V. involucrata, Rich. Tent. Fl. Abyss. i. 409, is of Abyssinia and of doubtful generic affinities.

V. Mameana, André, Rev. Hort. xiv. 16, f. 5 (1885), is a horticultural species described from the stem and foliage alone. There is no satisfactory evidence that it is of this genus.

V. MEGAPOTAMICA, Spreng. Syst. iii. 578; DC. Prodr. v. 618, of the Prov. Rio Grande, Brazil, but unmentioned in the Flora Brasiliensis, is not recognized.

V. POPULIFOLIA, Hill, Hort. Kew. 31, poorly known and probably, like the other Old World species, not really of this genus.

V. PROSTRATA, Hook. & Arn. Bot. Beech. 195, is a prostrate and creeping Chinese plant with somewhat triangular achenes.

V. SCANDENS, Roxb. Hort. Beng. 62, & Fl. Ind. iii. 441, is an E. Indian plant unrecognized by recent writers.

V. SCAPOSA, Jones, Zoe, ii. 248, with scapose chiefly 1-headed peduncles and large radical leaves arising from a tuberous root, is a very doubtful member of the genus, not seen by the writers.

V. TRIPLINERVIA, Vis. Nuov. Sag. Accad. Padova, v. 264, Walp. Rep. ii. 621, said to be Mexican, is unrecognizable from its insufficient characterization.

V. TRIRADIATA, Vell. Fl. Flum. viii. t. 115, is altogether doubtful.

TRANSFERRED SPECIES.

V. ALTERNIFOLIA, Britton in Kearney, Bull. Torr. Club, xx. 485, is *Actinomeris squarrosa*, Nutt.

V. ANCISTROPHORA, Gray, Proc. Am. Acad. xix. 14 (1883), being *Ancistrophora Wrightii*, Gray, Mem. Am. Acad. ser. 2, vi. 457 (1859), is *V. Wrightii*, Griseb. Cat. Pl. Cub. 155 (1866), which should not be displaced by *V. Wrightii*, Gray, Proc. Am. Acad. xix. 12 (1883).

V. BRIDGESII, Rusby, Mem. Torr. Club, iv. 212, is *V. boliviana*, Klatt.

V. CYMOSA, Gray, Proc. Am. Acad. xxi. 390, is *V. pauciflora*, Hemsl.

V. HASTATA, Kellogg ex Curran, Bull. Calif. Acad. i. 140 (1885), is *V. venosa*, Greene, Bull. Torr. Club, ix. 110 (1882).

V. HOOKERI, Klatt, Leopoldina, xx. 92, being *V. helianthoides*, H. & A. in Hook. Jour. Bot. iii. 316, not DC., is *V. Arnottii*, Baker in Mart. Fl. Bras. vi. pt. 3, 215.

V. LINIFOLIA, L. Syst. Nat. ed. 10, ii. 1226, founded on t. 149, f. 3 of Sloane's Hist. Jam., is *Pectis linifolia*, L., which rests on the same plate.

V. OAXACANA, Klatt, l. c. xxiii. 144, not DC., is *V. oliracea*, Klatt.

V. OVATA, Gray, Proc. Am. Acad. xix. 13, is *V. pterocaula* [Moc. & Sess.] DC.

V. PANICULATA, Heller, Cat. N. Am. Pl. 8, not Poir., is *Actinomeris alba*, Torr. & Gray.

V. PERSICIFOLIA, Klatt, Leopoldina, xx. 93, not DC., is *V. virgata*, Cav.

V. PINNATIFIDA, Gray in Wats. Proc. Am. Acad. xxii. 428 (Palmer's no. 698 from Jalisco), certainly not of Cav., is probably sterile *Montanoa grandiflora*, Sch. Bip.

V. PODOCEPHALA, Gray, Pl. Wright. ii. 92, is *Zexmenia podocephala*, Gray, Syn. Fl. i. pt. 2, 286.

V. SARTORII, Sch. Bip. in Klatt, l. c. xxiii. 143, is *V. olivacea*, Klatt.

V. SCANDENS, Klatt, Leopoldina, xxv. 106, is acc. to Klatt, Ann. Natur. Hofmus. Wien, ix. 362, *Salmea Eupatoria*, L.

V. TOMENTOSA, DC. Prodr. v. 614, imperfectly described and without exact locality, may be doubtfully referred to *V. sublobata*, Benth.

V. TRIDENTATA, Spreng. l. c. 577, is *Aspilia buphthalmiflora*, Griseb.

V. TUBEROSA, Klatt, Ann. Natur. Hofmus. Wien, ix. 361, is *Zexmenia aurea*, Benth. & Hook. f. Gen. ii. 373 (*Wedelia? aurea*, D. Don, Bot. Mag. t. 3384; *Verbesina aurea*, DC. Prodr. v. 613).

III. — SOME NEW SPECIES, EXTENDED RANGES, AND NEWLY NOTED IDENTITIES AMONG THE MEXICAN PHANEROGAMS.

By J. M. GREENMAN.

Eleocharis acicularíformis. Perennial: rhizomes dark brown, creeping, rather stout, freely branched: culms 5 to 8 cm. high, tufted at the nodes of the rhizome, vaginate at the base: sheaths reddish-brown below, hyaline above: spikes elliptic-ovate, 4 to 6 mm. long, about 12-flowered; scales ovate, obtuse, somewhat compressed, green on the back with reddish-brown sides and scarious margins: setæ 3, a little over 1 mm. in length: achenes oblong-obovate, about 1 mm. long, rather abruptly narrowed at the summit, longitudinally ribbed, and transversely striated: tubercle about one third as broad as the achene. — Collected by C. G. Pringle in the Valley of Mexico, Federal District, 7 May, 1898, no. 6818.

This species seems most nearly related to *E. acicularis*, R. Br., but differs in the stouter habit, the more conspicuously sheathed culms, and the more persistent and longer setæ.

Smilax Pringlei. Stems terete, unarmed, somewhat tawny-pubescent, later becoming glabrous or nearly so: leaves alternate, ovate or ovate-oblong, 7 to 12 cm. long, 4 to 6.5 cm. broad, cordate or occasionally subtruncate, short-acuminate, acute, entire, 5–7-nerved with rather prominently reticulated veins, glabrous above or slightly pubescent on the nerves, more or less pubescent beneath, later becoming glabrous except on the rather densely hirsute-pubescent nerves; petioles 1.5 to 2 cm. long, pubescent, ceriferous near the base: peduncle 2 to 4.5 cm. long, pubescent; pedicels 6 to 12 mm. long, these as well as the slender flower-buds grayish-puberulent: perianth-divisions of the staminate flowers linear-oblong, 6 to 8 mm. long, 1 to 1.5 mm. broad, obtuse, 1-nerved, in anthesis recurved: pistillate flowers not seen: mature fruit smooth, globose, about 1 cm. long; seeds ovate, 5 mm. long, 3 mm. broad, reddish-brown. —Collected by C. G. Pringle in a barranca near Cuernavaca, State of Morelos, 20 November, 1895, no. 7060, and in the same locality at an altitude of 1,800 m., 18 June, 1896, no. 7259, also in mountain cañon above Cuernavaca, altitude 2,000 m., 15 May, 1898, no. 6843.

A species climbing to 6 m. and most nearly related apparently to *S. erythrocarpa*, Kunth, from which it is distinguished by the pubescent character and by the shorter peduncles.

Agave (Littæa) intrepida. Acaulescent: leaves numerous in a rosette, lance-attenuate, about 4.5 dm. long, 1.5 to 2.5 cm. broad, gradually narrowed to a rather slender reddish-brown end spine, somewhat dilated at the base to a breadth of 2.5 to 4 cm., smooth and in the dried state more or less striate upon either surface, margins cartilaginous, minutely, closely, and evenly serrulate from base to apex: scape 1 to 1.25 m. high, clavate: bracts of the peduncle scattered; floral bracts lance-attenuate, slightly exceeding the flowers, scarious: flowers in pairs, 3.5 to 4 cm. long: perianth-tube 1.2 to 1.4 cm. in length; lobes oblong, somewhat shorter than the tube, slightly thickened at their pubescent apices: stamens inserted at about the middle of the perianth-tube, overtopping the stigma and more than twice exceeding the perianth: capsule 1.7 cm. long, nearly 1 cm. in diameter. — Collected by C. G. Pringle on mossy cliffs, Parque Station, State of Morelos, altitude 2,100 m., 2 June, 1898, no. 6868.

This species is apparently related to *A. dasylirioides*, Jacobi & Bouché, but differs materially in size and habit. In Mr. Pringle's plant the

scape is erect, not pendulous, and the bracts of the peduncle are scattered, not secund and falcate, which is perhaps the most striking character of *A. dasylirioides*. The specific name is suggested by the seemingly perilous habitat of the plant in its native haunts. As stated by Mr. Pringle, *A. intrepida* grows "on the faces and tops of the strange castellated knobs of bare conglomerate, which form a range fifteen to twenty miles to the east of Cuernavaca."

SISYMBRIUM COULTERI, Hemsl. Diag. Pl. Nov. pars alt. 18, & Biol. Cent.-Am. Bot. i. 35. Specimens of this species were collected by Mr. C. G. Pringle on limestone hills near Pachuca, State of Hidalgo, altitude 2,500 m., 17 August, 1898, no. 6963. In the original characterization the flowers are described as *white*. This character, however, must pertain to the corolla only, as the sepals in the type specimen, namely Parry and Palmer's no. 14 (coll. of 1878), and especially in Mr. Pringle's specimens above cited, are distinctly roseate.

PHASEOLUS MICROCARPUS, Mart. Ausw. Merkw. Pfl. 18, t. 12 (1850? acc. to Jackson, Lit. Bot. 429). This species, although well characterized and excellently illustrated in the above cited work, seems to have been overlooked and omitted from the more generally used lists of Mexican plants, including Hemsley's Biol. Cent.-Am. Bot. *P. monospermus*, Rob. & Greenm. Proc. Am. Acad. xxix (1894), 385, is now regarded as a synonym of *P. microcarpus*, Mart., and to the latter species may be referred Pringle's no. 5446, collected in a barranca near Tequila, State of Jalisco, and also specimens collected by the late Rev. Lucius C. Smith at Monte Alban, State of Oaxaca, altitude 1,900 m., 11 October, 1895, no. 931.

CROTON EHRENBERGII, Schl. Linnæa, xix. 248; DC. Prodr. xv. pt. 2, 636. Specimens collected by Mr. C. G. Pringle at Cerro Ventoso above Pachuca, State of Hidalgo, altitude 2,600 m., 18 August, 1898, no. 6967, are referred confidently to the above species, notwithstanding the slightly larger leaves.

EUPHORBIA DICTYOSPERMA, Fisch. & Mey. Ind. Sem. Hort. Petrop. ii. 37; DC. Prodr. xv. pt. 2, 135. Excellent specimens of this very characteristic species were collected by Mr. C. G. Pringle on wet meadows of the Sierra de Pachuca, State of Hidalgo, altitude 2,900 m., 13 August, 1898, no. 6960. The species seems not to have been hitherto recorded from Mexico.

Styrax Ramirezii. Tree, 9 to 12 m. high: branchlets finely ferrugineous-stellate, furrowed: leaves alternate, petiolate, oblong-lanceolate, 1 to 1.5 dm. long, 3.5 to 5 cm. broad, acuminate, acute or obtusish, cune-

ate at the base, entire, glabrous and smooth upon either surface, or slightly roughened on the prominent midrib and nerves beneath, rather strongly reticulately veined, the lower surface somewhat glaucous: inflorescence racemose; racemes axillary, including the peduncle 6 cm. or less in length; rhachis, pedicels, and the minute bracts closely ferrugineous-stellate: flowers subsecund: calyx cupulate, 5 to 6 mm. high, about equalling the pedicels, shallowly sinuate, 5-dentate, argenteous-lepidote: corolla about 1.5 cm. long; externally and along the margins of the upper surfaces of the lobes argenteous-pubescent or somewhat scaly: filaments and ovary above stellate-pubescent: fruit not seen. — Collected by C. G. Pringle in mountain cañons above Cuernavaca, State of Morelos, altitude 2,000 m., 15 May, 1898, no. 6848.

The species is named in honor of Sr. Dr. José Ramirez, Director of El Instituto Médico Nacional, City of Mexico.

MENODORA HELIANTHEMOIDES, Humb. & Bonpl., var. parviflora. Stems several, procumbent, more or less branched, 5 to 20 cm. long: foliage and inflorescence of the species: calyx 6 to 7 mm. long, usually 11-lobed: corolla about 1 cm. long, equally 5-lobed; lobes oblong-elliptic, 6 to 7 mm. long, 3 to 4 mm. broad: mature capsule about 6 mm. high, nearly 1 cm. broad. — Collected by C. G. Pringle on bare hills above Pachuca, State of Hidalgo, altitude 2,600 m., 30 July, 1898, no. 6918.

A well marked variety, differing from the species chiefly by the smaller flowers and less hirsute-pubescent branches.

Sabbatia arenicola. Annual, glabrous throughout: stems 5 to 10 cm. high, dichotomously much-branched, more or less 4-angled: leaves sessile, ovate-oblong to elliptic-oblong, 0.5 to 1.5 cm. long, about one half as broad, obtuse, entire, thickish, inconspicuously 3–5-nerved: flowers terminating the branches, pedunculate: peduncles 0.5 to 1.5 cm. in length: calyx campanulate, pentagonal, later becoming turbinate and strongly 5-ribbed along the angles; lobes lance-oblong, 5 to 10 mm. long, 2 to 4 mm. broad, obtuse, entire: corolla lilac or rose-purple, about 1 cm. or more in diameter, yellowish in the throat, persistent; lobes obovate-rotund: stamens adnate to the throat of the corolla; filaments one half as long as the corolla-lobes: mature capsule 5 to 6 mm. long; seeds strongly reticulated. — Collected by C. G. Pringle on damp sands of seacoast near Tampico, State of Tamaulipas, 28 April, 1898, no. 6808.

A species most nearly related to *S. campestris*, Nutt., but readily distinguished by the less attenuate calyx-lobes and the much smaller corolla.

Acerates Pringlei. Stems 10 to 20 in clumps, stout, herbaceous, rather densely and finely pubescent: leaves opposite, short-petiolate, ovate or ovate-oblong, 6.5 to 10.5 cm. long, 3 to 6 cm. broad, acute, entire, somewhat truncate or subcordate at the base, rarely slightly narrowed below, sparingly pubescent to essentially glabrous above, paler and pubescent especially upon the prominent veins beneath; petioles 4 to 14 mm. long, canaliculate and often bearing above at the junction of the blade several small gland-like bodies: inflorescence lateral, extending well down on the stem, interpetiolar; peduncles 3 to 8.5 cm. in length, many-flowered, these as well as the pedicels (1.2 to 1.5 cm. long) closely pubescent or subtomentose: bracts linear, setaceous, about 6 mm. long, fugaceous; flowers about 5 mm. high: sepals linear, acute, 4 mm. long, externally pubescent: lobes of the corolla oblong, 5 mm. in length, usually slightly retuse at the apex, glabrous, externally more or less purplish and with the purplish-tinged sepals early reflexed: collar of the gynostegium short but distinct, the short ovate-oblong incurved-auricled hoods of the crown exceeding the gynostegium and entirely devoid of any horn-like process: immature follicles somewhat ovoid or slightly ovate-oblong, short-acuminate, slightly puberulent: seeds reddish-brown, smooth, about 8 mm. broad.—Collected by C. G. Pringle, on the Sierra de Ajusco, State of Morelos, altitude 2,800 m., 21 May, 1898, no. 6853 (in flower), and on the Plan de Salazar, State of Mexico, altitude 3,000 m., 13 August, 1896, no. 7309 (in fruit).

A species superficially resembling *Asclepias neglecta*, Hemsley, but distinctly different in floral structure.

Gonolobus (§ Chthamalia) bifidus, Hemsl. Biol. Cent.-Am. Bot. ii. 330. *G.* (§ *Chthamalia*) *Schaffneri*, Gray, in Hemsl. l. c. 334. After a careful examination and comparison of the type specimens representing these two species there can be no doubt as to their absolute identity, and the name of Dr. Gray must give way to that of Hemsley by right of priority of position.

Here also may be referred Pringle's no. 6898, collected on the plains near Pachuca, State of Hidalgo, altitude 2,500 m., 3 July, 1898.

Ipomœa nymphæifolia, Griseb. Cat. Pl. Cub. 203. It is interesting to note that this characteristic West Indian species was collected by C. & E. Seler in Chiapas, 11 February, 1896, no. 1802. This species seems not to have been hitherto reported from Mexico.

Macromeria Pringlei. Stems herbaceous, erect, about 4 dm. high, branching from a perennial base, subappressed, hirsute-pubescent: leaves sessile or nearly so, lance-oblong, 5 to 11 cm. long, 1 to 3 cm. broad,

acuminate, acute, entire, appressed-tuberculate-hispid above, more or less appressed-hirsute-hispid slightly paler and prominently nerved beneath: inflorescence terminal; pedicels 5 to 6 mm. long: calyx 8 to 10 mm. long, deeply 5-parted, canescent-hirsute; lobes linear, acute: corolla 4 to 4.5 cm. long, covered externally with a spreading hirsute pubescence; lobes ovate-oblong, about 8 mm. long, obtuse: stamens nearly or quite equalling the corolla. — Collected by C. G. Pringle under firs, on the Sierra de Pachuca, State of Hidalgo, altitude 3,000 m., 4 August, 1898, no. 6949.

Solanum jaliscanum. Stems ligneous, unarmed, covered below with a grayish-green cortex, the younger branches, as well as the foliage, pedicels, and calyx, stellate-pubescent: leaves thin, submembranous, usually in pairs, very unequal in size, the larger 8 to 13 cm. long, 2.5 to 4.5 cm. broad, the smaller less than half as large, obtuse, gradually narrowed at the more or less unequal base into a petiole 5 to 20 mm. in length, stellate-pubescent on either surface: inflorescence in sessile extra-axillary umbels: pedicels during anthesis 8 mm. or less in length, later erect, about 1 cm. long: calyx 5 to 7 mm. long, 5-lobed; lobes somewhat irregular, ovate-oblong to oblong-linear, obtuse: corolla rotate, about 1 cm. in diameter; lobes ovate, acute, externally stellate-pubescent, the upper or inner surface glabrous: stamens equal, about 2.5 mm. long: fruit globular, smooth, nearly or quite 1 cm. in diameter. — Collected by C. G. Pringle, barranca of Guadalajara, State of Jalisco, 29 June, 1889, no. 2909, and in the same locality, altitude 1,200 m., 10 June, 1898, no. 6870.

A species having the general habit of *S. capsicastrum*, Link, *S. validum*, Rusby, and *S. lignescens*, Fernald, and perhaps most nearly related to the last, from which, however, it is distinguished by the larger thinner leaves, the somewhat smaller corollas, and erect fruiting pedicels.

Solanum jasminifolium, Sendt. in Mart. Fl. Bras. x. 13; DC. Prodr. xiii. pt. 1, 81. Specimens collected by Mr. C. G. Pringle in hedges about Cuernavaca, State of Hidalgo, altitude 1,500 m., 25 June, 1898, no. 6901, are referred to the above species, hitherto unreported from Mexico. The leaves on the specimens at hand from Mr. Pringle are for the most part simple and entire. Several specimens, however, of *S. jasminifolium* in the Gray Herbarium have leaves from entire to deeply pinnatisect, thus indicating considerable variability as to foliage. It may be said further that it is difficult to separate from this species the nearly related and also South American *S. boerhaviæfolium*, Sendt. l. c. 48, t. 11.

Cestrum flavescens. Shrub, about 1 m. in height: stems covered with a light grayish bark, the young shoots finely pubescent: leaves ovate to ovate-elliptic, 3 to 5 cm. long, one half to two thirds as broad, obtuse, narrowed at the base into a slightly winged petiole (5 to 10 mm. in length), more or less pubescent on either surface, especially on the veins beneath: inflorescence subracemose at the ends of the branches; peduncles and sometimes the pedicels apparently adnate to the base of the petioles: calyx about 5 mm. long, 5-lobed; tube glabrous or slightly puberulent; lobes triangular-ovate, a little irregular, 1 to 1.5 mm. long, acute, tomentulose at the tips: corolla 2 to 2.5 cm. long, reddish-yellow, tubular, gradually ampliated above, constricted at the throat, glabrous; lobes broadly ovate, about 2 mm. long, obtuse, pubescent along the margins, reflexed: stamens included, glabrous: immature fruit glabrous. — Collected by C. G. Pringle, in lava fields near Cuernavaca, State of Morelos, altitude 1500 m., 11 May, 1898, no. 6832.

In general appearance this species bears a superficial resemblance to the Guatemalan *C. Regelii*, Planch. Fl. Serres, ix. t. 946; but from the latter Mr. Pringle's plant is amply different, in the less acuminate leaves, the shorter and broader calyx-lobes, and finally in the longer and more slender corollas.

PITHECOCTENIUM BUCCINATORIUM, DC. Prodr. ix. 195. *Bignonia buccinatoria*, Mairet in DC. l. c.; Hemsl. Biol. Cent.-Am. Bot. ii. 490; Hooker in Bot. Mag. t. 7516.

In 1878 Parry and Palmer collected in the mountains of San Luis Potosi both flowering and fruiting specimens of this species, and later in 1880 complete specimens were secured by Prof. Dugès in the vicinity of Guanajuato. The characters of the fruit, hitherto unknown, clearly indicate that the affinity of the plant is with the genus *Pithecoctenium* and not with *Bignonia*. The following supplementary description may be given: capsule oblong-elliptic, 1.4 to 1.6 dm. in length, about 6 cm. broad, somewhat narrowed at either end and densely echinate over the entire surface; valves at maturity falling away from the replum: seeds disposed in 4 to 5 rows. To this species may be referred specimens from the following stations: San Luis Potosi, *Parry & Palmer*, no. 695, *Schaffner*, no. 746; vicinity of Guanajuato, *Dugès* (coll. of 1880), without number; Puebla, *Bilimek*, no. 230, and by the same collector at "Cakobaya," no. 229; and in the cultivated state at Orizaba, *Botteri*, no. 915, and *A. Gray* (coll. of 1885), without number.

Ruellia malacosperma. Perennial, conspicuously lineolate throughout: stems 3 to 5 dm. high, erect or ascending from a ligneous base, te-

rete or obtusely 4-angled, glabrous or sparingly villous: leaves opposite, oblong-lanceolate, including the narrow less villous petiole 5 to 13 cm. long, 1 to 3 cm. broad, acuminate, acute or the lower obtuse or even rounded at the apex, narrowed at the base into a petiole, entire or subrepand, densely lineolate on either surface, and with a few scattered villous hairs on the midrib and margins, especially towards the base: inflorescence cymose-paniculate; peduncles 4 to 6 cm. long; pedicels 0.5 to 1.5 cm. long; bracts and bracteoles lance-linear, 1 cm. or less in length: calyx deeply and regularly 5-parted; tube 2 to 4 mm. long; divisions linear-attenuate, 1 to 2 cm. long, these as well as the pedicels densely lineolate and stipitate-glandular, not hirsute: corolla purple, 4 to 5.5 cm. long, tubular-funnelform, externally puberulent; tube slender below, ampliated above; lobes subrotund, 1.5 cm. or more broad: mature capsules 2.5 to 3 cm. long, glabrous, about 15-seeded; seeds slightly oblique, 3 mm. broad, flattened, canescent. — Collected by C. G. Pringle in lowlands near Tampico, State of Tamaulipas, 30 April, 1898, no. 6806; and by Dr. Edward Palmer in the vicinity of Acapulco, October, 1894, to March, 1895, no. 570 (distributed as *Ruellia? ovalifolia*, Hemsl. ex char.?); also by Botteri at Orizaba, in herb. Gray without number.

A species having its affinity apparently with *R. dipteracanthus*, Hemsl., and *R. tuberosa*, L., but differing from the former by inflorescence and longer corolla, also by the character of the calyx, and from the latter by the foliar characters. The seeds of this plant in the dried state are covered with an appressed canescent pubescence, which however, when moistened, is more or less spreading and almost velvety, hence the specific name.

Randia canescens. Shrub or small tree, 3 to 5 m. high: stems terete, covered with a grayish bark: spines 5 to 10 mm. in length: leaves broadly obovate, 1 to 1.5 cm. long, nearly as broad, abruptly narrowed below into a short petiole or subsessile, rounded or obtuse at the apex, canescent-pubescent on either surface: flowers solitary, terminating short axillary branches: calyx-tube about 4 mm. long, appressed-canescent-pubescent; lobes linear, acute, about equalling the tube, grayish-pubescent: corolla salverform; tube nearly 1 cm. long, somewhat folded on itself near the middle, externally pubescent, internally glabrous: lobes somewhat thickened, broadly ovate, about 6 mm. long, nearly as broad, obtuse or rounded at the apex, glabrous above, ciliate: fruit not seen. — Collected by C. G. Pringle in barrancas near Cuernavaca, State of Morelos, altitude 1,500 m., 28 May, 1898, no. 6863.

Randia Nelsonii. Stems sparingly armed, covered with a grayish or reddish-brown bark, rather numerously dotted with lenticels; the young shoots pubescent: leaves thin in texture, obovate or subcuneate, 1.5 to 3 cm. long, two thirds as broad, narrowed at the base into a short petiole, usually rounded, but occasionally slightly retuse, obtuse, or even short acuminate-apiculate at the apex, soft-pubescent on either surface: flowers axillary, solitary, sessile: calyx including the slender spreading lobes not exceeding 5 mm. in length, canescent-pubescent especially on the tube: corolla including the lobes 2.5 to 3 cm. long; tube about 1.5 cm. long, externally puberulent, internally pubescent in the upper half; lobes oblong-ovate, obtuse, nearly glabrous. — Collected by E. W. Nelson on the way from Juchitan to Chivela, State of Oaxaca, altitude 46 to 277 m., 1895, no. 2635.

A species somewhat resembling *R. Pringlei*, Gray, but readily distinguished from it by the texture of the leaves, the infloresence, the longer corolla, and shorter calyx-lobes.

Eupatorium Conzattii. Glabrous throughout: stems herbaceous, ancipitally compressed and subhexagonal, striate, reddish-brown: leaves petiolate, oblong-lanceolate, 5 to 15 cm. long, 2 to 6 cm. broad, acuminate, acute, obtuse or somewhat rounded at the base and slightly decurrent on the (7 to 20 mm. long) petioles, crenate-dentate, distinctly 3-nerved from above the base, conspicuously veined, pellucid-punctate: inflorescence terminating the stems in a compound pyramidal panicle: heads 8 to 9 mm. long, clustered at the tips of the branchlets in threes or fives, sessile or short-pedicellate, 5–6-flowered; involucre cylindrical; scales imbricated, 5–6-seriate, oblong, obtuse or rounded at the tip, distinctly nerved, purplish or stramineous, the outer gradually shorter and darker: flowers about 8 mm. long: achenes 4 mm. long, glabrous; pappus equalling the corollas. — Collected by Prof. C. Conzatti in humid forests on the Cerro del Chiquihuite, Colonia Melchor Ocampo, Cordoba, State of Vera Cruz, altitude 1,300 m., 7 December, 1895, no 17.

This species may be recognized readily by the 3-nerved prominently veined pellucid-punctate leaves associated with the few-flowered cylindrical heads. In general aspect *E. Conzattii* resembles *E. vanillosmoides*, Sch. Bip., but is easily distinguished from it by the venation of the leaves. From *E. tepicanum*, Hemsl., which is said to have ovate-lanceolate pellucid-punctate leaves, our plant differs in having herbaceous instead of woody branches.

Eupatorium leptodictyon, Gray, in Wats. Proc. Am. Acad. xxii. 420. Excellent specimens of this characteristic species were collected by

Dr. Rose in the Sierra Madre, State of Tepic, nos. 1984, 3418. The following supplementary characters may be appended: stems herbaceous from a thick perennial base, 5 to 6 dm. high, simple or sparingly branched: leaves usually alternate, not unfrequently opposite or at least subopposite. *E. leptodictyon* closely resembles *E. strictum*, Gray, but may be distinguished readily from it by the fewer broader and more blunt bracts of the involucre, and by the larger flowers.

Grindelia glandulosa. Apparently biennial: root somewhat obconical: stems subcespitose, erect, simple or sparingly branched, 2 to 3 dm. high, glandular-pubescent with spreading hairs intermixed: basal leaves spatulate, attenuate at the base, including the petiole 6 to 10 cm. long, 1 cm. or less in breadth; stem leaves narrowly oblong or oblong-lanceolate, slightly broadened at the sessile subclasping base, acute, regularly and rather closely serrate, glandular-pubescent upon either surface, 2.5 to 5 cm. long, 6 to 10 mm. wide; the uppermost leaves gradually reduced and more or less acuminate: heads terminating the stems, solitary, excluding the rays 1.5 to 2 cm. in diameter; involucral scales strongly imbricated, purplish, lanceolate, acuminate, terminated by an acutish glandular-viscid tip; margins thin, purplish, suberose, glandular-ciliate, the outer somewhat narrower: ray-flowers 20 to 35; ligules oblong-spatulate, including the tubular portion nearly 2 cm. long: pappus usually bisetose, rarely trisetose or sometimes with a single awn, fugaceous: achenes smooth. — Collected by C. G. Pringle in wet meadows of the Sierra de Pachuca, State of Hidalgo, altitude 3,000 m., 13 August, 1898, no. 6962. Seemingly a very distinct species, readily recognized by the glandular character of the pubescence throughout the entire plant.

Baccharis macrocephala, Sch. Bip. in herb. Gray. Perennial, glabrous throughout: stems somewhat striated, covered with a grayish bark: leaves scattered, sessile, spatulate-lanceolate, 2 to 3 cm. long, 3 to 6 mm. broad, acute, often with a sharply recurved apex, entire and usually hispidulous on the margins or with a few remote horizontally spreading teeth near the apex, glandular-dotted on either surface and more or less viscid, 1–3-nerved, the leaves of the flowering branches much smaller and more or less squarrose-imbricated: inflorescence paniculate-virgate, leafy: heads terminating the branches of the inflorescence, those of the fertile plant nearly or quite 1.5 cm. high, many(90–100)-flowered: involucral scales unequal, 6–7-seriate, imbricated, lance-linear with a dark green midnerve, acute, glabrous, margins scarious and often slightly erose, the inner about 7 mm. long, the outer shorter: pappus white or slightly tawny, nearly or quite 1 cm. in length; achenes glabrous: heads of the staminate

plant about 1 cm. high. — Collected by C. Sartorius in Vera Cruz, altitude 2,700 m., April, 1856; and by C. G. Pringle, Serrania de Ajusco, Federal District, altitude 2,700 m., 23 May, 1898, no. 6859.

A species resembling in habit *B. ramiflora*, var. *squarrulosa*, Gray, but having larger and more numerously flowered heads, and a longer pappus, also related apparently to *B. squarrosa*, HBK., from which, however, it is distinguished by the entire absence of the squarrose character of the involucral scales. Only staminate plants were collected by Sartorius, yet the specimen in herb. Gray in the inflorescence, foliar and involucral characters, agrees so closely with Mr. Pringle's specimens that the writer has no hesitation in referring both to the above hitherto unpublished species.

Desmanthodium lanceolatum. Herbaceous, perennial (?): stems 1 to nearly 2 m. high, freely branching above, striate, glabrous, purplish; internodes much exceeding the leaves: leaves lanceolate to lance-ovate, acuminate, acute, 5 to 10 cm. long, 2 to 4 cm. broad, narrowed below into a subpetiolate base, sharply and somewhat unequally dentate with prominent and more or less divaricately spreading teeth, essentially glabrous upon either surface, paler beneath, margins ciliate-hispid: heads terminating the branches in sessile dense glomerules disposed in a cymose-panicle: bracts broadly ovate, acute, glabrous; margins whitish or subscarious: fertile achenes elliptic-oblong, narrowed at either end, 3 mm. long, black, shining. — Collected by C. G. Pringle, on mountains above Cuernavaca, State of Morelos, altitude 2,100 m., 9 August, 1898, no. 6940.

This species is similar in habit and inflorescence to *D. ovatum*, Benth., but easily distinguished by the lanceolate sharply dentate leaves, and by larger and less obovate achenes.

LEPACHYS COLUMNARIS, Torr. & Gray, var. PULCHERRIMA, Torr. & Gray, Fl. ii. 315; Gray, Syn. Fl. i. pt. 2, 264. *Obeliscaria pulcherrima*, DC. Prodr. v. 559. *Ratibida columnaris*, var. *pulcherrima*, Don in Sweet, Brit. Fl. Gard. n. s. iv. t. 361.

To this well marked variety, characterized by the brown-purple rays more or less bordered with yellow, the following Mexican specimens may be referred. — Coahuila, Carrizilos, 28 May, 1847, *Gregg*, no. 60, *Palmer*, no. 717 (coll. of 1880); Nuevo Leon, 28 September, 1897, *Rose*, no. 3077.

Bidens decumbens. Stems decumbent, 1.5 to 3 m. long, tetragonal, striate, glabrous except at the nodes, purplish: leaves simple and broadly ovate, oblong-ovate to obovate, or pinnately 3-parted (the terminal division often rhombic-ovate, the lateral divisions obovate, unequal at the

base), decurrent into a petiole, acute or short-acuminate, mucronate, crenate-serrate with mucronate teeth, cuneate at the base, thickish, conspicuously veined, glabrous upon either surface or with a few scattered hairs on the midrib beneath; petioles 8 to 20 mm. long, channelled above, usually ciliate: inflorescence cymose or cymose-paniculate, few-headed; peduncles 1 to 3 cm. long: heads about 1 cm. high, radiate; outer scales of the involucre about 14, spatulate, 4 mm. long, obtuse, ciliate, the inner lance-oblong, 6 to 7 mm. long, narrowed near the obtuse puberulent tip: ray-flowers sterile; achenes 3-angular, exaristate; rays oblong-obovate, 2 cm. long, 8 mm. broad, white with yellowish nerves: disk-flowers numerous; mature achenes linear, 6 to 10 mm. long, longitudinally ribbed, glabrous or hispidulous on the angles especially towards the apex, 2–4-aristate. — Collected by C. G. Pringle on sand dunes near Tampico, State of Tamaulipas, 29 April, 1898, no. 6820.

Bahia xylopoda. Perennial: stems decumbent, branching from the base: branches ascending, about 1.5 dm. high, more or less hoary-pubescent: leaves opposite or alternate, triternately compound, segments linear or subterete, obtusish, hirtellous-puberulent: heads radiate, about 1 cm. high, usually long-pedunculate, erect or nodding: involucral bracts subbiseriate, the outer oblong, somewhat truncate, rounded or obtuse at the apex, the inner often more narrowed at either end and acutish, veiny with thinnish margins, grayish-white-pubescent on the outer surface with stipitate glandular hairs intermixed: ray-flowers fertile; ligules including the pubescent tube nearly or quite 1 cm. long; disk-flowers numerous; pappus usually of 8 narrowly oblong-obovate subequal scales, about 2 mm. long, cuneate at the base: corollas of the disk-flowers 4 mm. long, below pubescent on the outside: mature achenes 5 to 6 mm. long, hirtellous-pubescent above, canescent on the angles of the slender base. — Collected by C. G. Pringle, on bare hills above Pachuca, State of Hidalgo, altitude 2,600 m., 30 July, 1898, no. 6931.

This species is nearly related to *B. Pringlei*, Greenm., but is distinguished readily by the longer achenes, narrower scales of the pappus, and also, according to Mr. Pringle, by the entire absence of running roots.

Cacalia ampullacea. Stems 1 to 2 m. high, striate, purplish, puberulent: lower leaves petiolate, oblong-ovate, 2 to 3 dm. long, two thirds as broad, membranous, pubescent above, white-tomentose beneath, about 13-lobed, with rounded sinuses, the main lobes 6 cm. or less long, these again irregularly dentate-lobed; stem leaves sessile, ovate-oblong, 1 dm. or less long, 1 to 1.5 cm. broad, strongly saccate below and surrounding the stem: inflorescence rather densely corymbose: peduncles

and pedicels tomentulose; bracts linear, setaceous; heads about 1 cm. high, 5–6-flowered; scales of the involucre 5 to 6, oblong-oblanceolate, 8 mm. long, 2 to 3 mm. wide, obtuse and slightly pubescent at the apex, otherwise glabrous; margins thin, subscarious: pappus somewhat tawny, about 5 mm. long; corolla glabrous: achenes pubescent. — Collected by C. G. Pringle along streams on the Sierra de Pachuca, State of Hidalgo, altitude 2,700 m., 17 July, 1898, no. 6917.

A species having its affinity with *C. tussilaginoides*, HBK., and *C. amplifolia*, DC. From the former it is distinguished by the outline and general character of the leaves, and from the latter by the white tomentum on the lower surface of the leaves, and the pubescent achenes.

Lactuca brachyrrhyncha. An erect herbaceous annual: stems 1 m. or more high, glabrous or nearly so, purplish: leaves lance-attenuate, 1 to 1.3 dm. long, about 1 cm. broad, acute, entire or remotely denticulate, sessile by a clasping sagittate base, glabrous upon either surface or bearing on the midrib beneath, especially towards the base, scattered rather long hairs, these often continuing with the subdecurrent midrib to the stem, the upper leaves gradually reduced: inflorescence in a terminal panicle; peduncles bracteate; heads 1.2 to 1.5 cm. high, about 20-flowered; involucral bracts imbricated, more or less deeply colored with purple, the outer short, ovate, acutish, the inner lance-linear: flowers blue: pappus white: achenes oblong-elliptic, 4 mm. long, one half as broad, abruptly contracted at the summit into a short beak less than 1 mm. in length. — Collected by C. G. Pringle at Tlalnepantla, Valley of Mexico, Federal District, 6 July, 1898, no. 6883.

A species habitally like *L. integrifolia*, Bigel., from which it is readily distinguished by the short yet distinct beak of the achenes.

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By B. L. Robinson and J. M. Greenman, Cambridge, Mass.

1. REVISION OF THE GENUS GYMNOLOMIA.

The genus Gymnolomia, so far as known, is exclusively American and extends from the northwestern parts of the United States to Brazil. More than half its species, however, are confined to Mexico and Central America. The genus in its present circumscription has never been monographed. Kunth when founding it in 1820 described 4 species. De Candolle in the Prodromus, 5, 561 (1836) changes rather arbitrarily Gymnolomia to Gymnopsis under which 10 species are described of which several have since been referred to other genera. In 1873, Bentham and Hooker f. ascribe to the genus Gymnolomia 16 species. Baillon in his Histoire des plantes regards the genus Gymnolomia as of doubtful value. Hoffmann in Engler and Prantl's Nat. Pflanzenfamilien maintains the genus and ascribes to it 20 species. Aside from the brief citations of the Index Kewensis by far the best bibliographic enumeration of the Gymnolomias is that of Hemsley (Biol. Cent.-Amer. Bot., 2, 161) who cites literature and stations for 15 species, found in Mexico and Central America.

The present revision, including 37 recognized species and several varieties, has been chiefly based upon the specimens in the Gray herbarium, now largely supplemented by the incorporation of the Klatt herbarium. But through the kindness of Mr. Coville and Dr. Rose, the representation of the genus in the U. S. national museum has also been examined with profit.

The revision of the genus has presented three chief difficulties, viz.: — 1. The distinction of our own western and southwestern forms, which have, notwithstanding great diversity of foliage, pubescence, size of heads, and duration, been loosely grouped under *G. multiflora*. 2. The exact interpretation of the Central American *G. subflexuosa*, Benth., upon which must depend the varietal and specific nomenclature of some of the nearly related species. 3. The explanation and proper treatment of several large-headed

Mexican species which although they differ conspicuously among themselves, closely simulate a parallel series of Viguieras. As examples of this parallelism may be mentioned

G. ensifolia with the habit of *V. blepharolepis.*

G. megacephala, var. *simulans* with the habit of *V. excelsa.*

G. decumbens with the habit of *V. ghiesbreghtii.*

G. ghiesbreghtii with the habit of *V. buddleiaeformis.*

This simulation has various degrees of closeness. In *G. ghiesbreghtii* and *V. buddleiaeformis*, although the similarity is striking, the heads are always perceptibly smaller in the Viguiera. *G. megacephala* var. *simulans* and *G. decumbens*, however, so closely resemble *V. excelsa* and *V. ghiesbreghtii* respectively, that no satisfactory external characters have as yet been found by which to separate them. The examination of the achenes, however, at once reveals striking differences. The achenes are in the Gymnolomias more compressed, quite glabrous, and completely destitute of pappus. In the Viguieras on the contrary they are thickish, obtusely 4-angled, upwardly villous, and provided with two stout persistent awns and several short intermediate scales. Were the pappus difference the only one, these viguieroid Gymnolomias might logically be reduced to "*formae epapposae*" of their pappus-bearing counterparts in Viguiera, there being in Calea and elsewhere undoubted examples of the presence and absence of pappus in what must be regarded as conspecific types. In Gymnolomia, however, the difficulty is increased by the presence of other although slight differences in the form and pubescence of the achene.

The writers have carefully considered the possible readjustment of generic lines in such a manner as to bring together the species of similar habit, but they have failed to find any way in which this could be accomplished without the union of heterogeneous elements or an inordinate multiplication of genera founded upon rather trivial characters. It has accordingly seemed best to maintain the genus Gymnolomia in its traditional interpretation, although there may be some artificiality in the classification of the large-headed forms. Further collections will doubtless throw much light, if not upon the genetic affinities, at least upon the validity or inconstancy of the characters by which they are now separated.

GYMNOLOMIA, HBK. (Name from γυμνός, naked, and λῶμα, margin; taken by some to refer to the rays destitute of pistils, by others the achenes lacking pappus.) Heads small, medium-sized, or large, heterogamous, many-flowered, pedunculate, solitary or more often 3 to many at the ends of the branches. Involucre hemispherical or subcylindric; the bracts mostly numerous, in 2 to 4 series, very variable in size and thickness, the outer mostly narrow; receptacle elevated, conical, chaffy; pales conduplicate, entire or somewhat 3-toothed. Ray-flowers (5 to 20) in a single series, neutral; ligules linear to elliptic-oblong, exserted and spreading, entire and slightly toothed at the tip, yellow or very rarely crimson; disk-flowers numerous, perfect, regular, concolorous; tube short, cylindrical or somewhat dilated at the base, usually puberulent; throat cylindrical or narrowly campanulate; the limb 5-toothed. Achenes of the ray-flowers abortive and empty, of the disk-flowers obovoid, thickish, but more or less compressed laterally or 4-angled, rounded at the summit; pappus none or rarely present as a short cup or ring of 2 to 4 laciniate scales. Nov. gen. et spec., 4, 217, t. 373, 374; Gray, Proc. Amer. acad., 5, 182; Syn. fl., 1, pt. 2, 66, 269; Benth. and Hook. f., Gen., 2, 363; Hemsl., Biol. Cent.-Amer. Bot., 2, 161; Baill., Hist. pl., 8, 211; Hoffmann in Engl. and Prantl, Nat. Pflanzenf., 4, ab. 5, 233. Gymnopsis, DC., Prodr., 5, 561, in part. Heliomeris, Nutt., Journ. acad. Phila., ser. 2, 1, 171. Zaluzania, Sch. Bip., Flora, 1861, p. 553; 1864, p. 216, in part.—Nearly 40 species, chiefly perennial herbs, in habit passing almost imperceptibly from plants of the Perymenium type to others of the Tithonia type. The following arrangement is believed to show approximately the natural affinities of the species.

Subg. 1. CALANTICARIA. Corolla-tube in the disk-flowers considerably dilated at the very base, the expansion, thus developed, forming a sort of cap over the summit of the achene: stems shrubby, except perhaps in *G. tripartita*: heads medium-sized; scales of the involucre mostly narrow.

* Leaves rather small, opposite, entire or merely undulate: scales of the involucre oblong, obtuse.

1. G. GREGGII, Gray. Closely branched shrub: leaves opposite, ovate, obtuse, cuneate to short petioles, pale green above, white-tomentulose beneath, 2 to 3 cm. long (incl. petiole), 1 to 1.8 cm. broad: peduncles long, mostly solitary at the ends of the branches.—

Proc. Amer. acad., 15, 36.—Northern Mexico, *Gregg*, no. 382; and on limestone hills Carneros Pass, Coahuila, *Pringle*, no. 2387.

* * Leaves alternate, larger, subentire.

2. G. CINERASCENS, Benth. and Hook. f. Dichotomous undershrub with brownish purple soft-pubescent leafy stems terminating in compound irregular many headed corymbs: leaves ovate-elliptic, 5 to 6 cm. long, 3 to 4 cm. broad; the upper oblong, attenuate at each end, acute, minutely serrulate, subtriplinerved, pubescent above: heads borne on white clavate peduncles: ligules (white?) neutral: achenes glabrous, without pappus.—Gen., 2, 362; Hemsl., l. c., 161. *Zaluzania cinerascens*, Sch. Bip., Flora, 1864, p. 219, whence above desc. is compiled.—S. Mexico, Mineral del Monte, *Ehrenberg*, no. 346. We have not been able to see specimens of this species but from Schultz statement that the corolla is cucullate over the achene there can be little doubt that it is to be referred to Subg. Calanticaria.

* * * Leaves lobed, scales of the involucre lance-linear, acute to attenuate.

3. G. PINNATILOBATA, Benth. and Hook. f. Shrub: branches covered with a fine white at length deciduous pubescence: leaves pinnately several-lobed, pale green above, white-tomentulose beneath, 3 to 6 cm. long (including the winged petiole), half as broad; lateral lobes blunt, the lower large, the upper smaller.—Gen., 2, 364; Hemsl., l. c., 163. *Zaluzania pinnatilobata*, Sch. Bip., Flora, 1864, p. 219.—South Mexico, Tehuacan, *Liebmann*, no. 384, *Pringle*, no. 6252; Cordillera of Oaxaca, *Galeotti*, no. 2124, acc. to Hemsl.; limestone mesas, San Antonio, Oaxaca, *Pringle*, no. 5731. Mr. E. W. Nelson's no. 1638 from Oaxaca forms a puzzling intermediate between this and the otherwise well-marked *G. tripartita*.

4. G. TRIPARTITA, Robinson and Greenman. Stems smooth and glabrous: leaves deeply and palmately 3-parted; segments narrow, oblong, acute, often bluntly lobed near the base, the lateral sometimes very short or in upper leaves wanting, paler but green beneath: heads numerous, slender-peduncled in an open corymb.—Amer. journ. sci., ser. 3, 50, 154.—Oaxaca, Cuicatlan, *L. C. Smith*, no. 239; Jayacatlan, *L. C. Smith*, no. 386.

5. G. TENUIFOLIA, Benth. and Hook. f. Low shrub, 1 m. or more high: leaves numerous, deeply 3-fid or pinnatifid with lobes few, linear to lance-linear, acute, green above, finely white pubes-

cent beneath, the margins revolute: peduncles long, solitary at the ends of the branches; bracts of the involucre attenuate. — Gen., 2, 364; Hemsl., l. c., 163; Gray, Syn. fl., 1, pt. 2, 269. *Heliomeris tenuifolia*, Gray, Pl. Fendl., 84; Pl. Wright., 1, 107; 2, 87. — Southwestern Texas, rocky cliffs of Turkey Creek and beyond the Pecos, *Wright*, no. 329; rocky hills near Eagle Springs, *Wright*, no. 1223, *Sutton Hayes*, no. 444; at Presidio, *Havard*, El Paso, *Gray*, *Jones*, no. 4347; Santa Maria, *Nealley*, no. 163; and Chenantes Region, *Nealley*, no. 576; New Mexico in the Organ Mts., *Wooton*, no. 442; Mexico, Tamaulipas, *Berlandier*, nos. 814, 2234, *E. W. Nelson*, no. 4507; Saltillo, *Gregg*, nos. 21, 125; Coahuila, *Palmer*, nos. 620 to 624 (coll. of 1880), *Pringle*, no. 148; Chihuahua, *Thurber*, no. 834; San Luis Potosi, *E. W. Nelson*, no. 4532.

Subg. 2. EUGYMNOLOMIA. Corolla-tube in the disk-flowers cylindrical or slightly enlarged at the base; leaves (often serrate) not lobed; stems mostly herbaceous.

* Heads usually numerous, pedunculate, small or more often medium-sized (disk 7 to 12 mm. broad excl. of the rays); involucral scales linear, acutish to attenuate: leaves mostly lance-linear to linear, rarely oblong.

+ Outer involucral bracts herbaceous, attenuate (1.1 to 1.7 cm. long) coarsely ciliate on the margin, otherwise nearly or quite glabrous: ligules 5 to 9, elliptic, showy: Georgia.

6. G. PORTERI, Gray. Tall slender erect corymbosely branched annual with lance-linear to linear chiefly alternate leaves coarsely ciliate near the base; those of the stem 6 to 12 cm. long: disk narrowly conical; pales striate, entire, pungent. — Proc. Amer. acad., 12, 59; Syn. fl., 1, pt. 2, 269; Meehan, Native fl., ser. 1, 2, 137, pt. 35; Chapm., Fl., ed. 3, 251. *Rudbeckia? porteri*, Gray, Pl. Fendl., 83; Chapm., Fl., ed. 3, 228. — Growing on scanty humus in hollows and crevices of granite rock on the summit and slopes of Stone Mountain, Georgia, where curiously local, *Porter* (type, in herb. Gray), *Ravenel*, *Hendee*, *Canby*, *J. D. Smith*, *Curtiss*, no. 1434, *Small*; fl. August to October.

+ + Outer involucral bracts (rarely elongated) usually appressed-pubescent or even hoary: ligules 10 to 14, linear or oblong: western U. S. and Mexico

7. G. MULTIFLORA, Benth. and Hook.f. Perennial: stems usually several (1.5 to) 9 or 12 dm. high, from a thickish lignescent stock, finely striate and covered with a very short-appressed grayish pubescence: leaves lanceolate or linear-lanceolate and acutish to lance-oblong or oblong and obtuse, 4 to 7 cm. long, 4 to 20 mm.

broad, attenuate at the base, finely pubescent, becoming scabrous especially above: heads (exclusive of rays) 1.2 cm. in diameter; involucral scales canescent with appressed hairs. — Benth. and Hook. f., acc. to Rothr. in Wheeler Rep., 6, 160, as to synon.; Gray, Syn. fl., 1, pt. 2, 269 only in part. *Heliomeris multiflora*, Nutt., Journ. acad. Phila., ser. 2, 1, 171; Wats., Bot. King exp., 170, at least in great part. — Rocky mountains and plains of Idaho, *Palmer*, no. 422; Wyoming, *Hayden*, no. 34, *Tweedy*, *Burglehaus*, *A. Nelson*, nos. 39, 1064, 2663; Colorado, *Rothrock*, no. 551, *Parry*, no. 420, *Greene*, no. 194, *Jones*, *C. S. Sheldon*, nos. 152, 468, *Cowen* (low and many-stemmed), *Miss Eastwood* (coll. July, 1889); Utah, *Jones*, nos. 5820, 5996; Nevada, in the Uintas, *Watson*, no. 606; New Mexico, *Wooton*, no. 484; California, *Gambel*, *Coville* and *Funston*, no. 806; and in the Rocky Mountains, without locality, by *Gordon*, *Burke*, and by *Frémont*, no. 121. Toward the southwest this species passes into somewhat narrower-leaved forms (Utah, *Ward*, nos. 647, 652, *Jones*, no. 5996 r; Arizona, *Palmer*, coll. of 1869 without number and no. 241 coll. of 1877, *Knowlton*, no. 6; S. E. California, *Purpus*, no. 5025), which, however, retain their perennial character.

8. **G. longifolia**. Erect paniculately branched annual: stem single, 6 to 12 dm. high, finely pubescent with appressed hairs: leaves lance-linear or oblong-linear, narrowed at both ends, those of the stem 8 to 11 cm. long, 5 to 10 mm. broad, entire or obscurely and remotely crenate-serrate, finely pubescent on both surfaces, becoming very scabrous and tuberculate-hispid above, often ciliate toward the base; peduncle and involucral bracts covered with fine appressed pubescence; heads numerous, in size and floral characters essentially like those of *G. multiflora*. — *G. multiflora*, Hemsl., l. c., 162, as to Mex. pl.; Gray in Wats., Proc. Amer. acad., 21, 432; Syn. fl., 1, pt. 2, 269, in part; not Benth. and Hook. f. *Heliomeris multiflora*, Gray, Pl. Wright., 1, 107; 2, 87, in part, not Nutt. — W. Texas, *Wright*, no. 328, *Havard*, *Neuley*, no. 432 (depauperate), *Dr. Smart*, no. 422; New Mexico, "on pine hills between the copper mines and the mimbres," *Wright*, no. 1221; Burro Mts., *Rusby*, no. 172; Arizona, Rucker's Valley, *Lemmon*, nos. 345, 2765, and 383 (a form with double flowers); Nagle's Ranch, *Jones*, no. 6054 p.; Mexico, between San Luis Potosi and Tampico, *Palmer*, no. 1102; hills and plains near the town of Chihuahua, *Pringle*, no. 615; S. W. Chihuahua, *Palmer*, no. 392; Strawberry Valley,

Chihuahua, *Hartman*, no. 777; vicinity of Durango, *Palmer*, no. 754; Chiapas, *Ghiesbreght*, no. 63. Types in herb. Gray.

9. **G. annua**. Annual, slender, often branched from the base, 3 to 5 dm. high, copiously branched above: leaves linear or nearly so, finely appressed-pubescent and even somewhat canescent, slightly ciliated at the base or not at all, the cauline 4 to 7 cm. long, 2 to 3 mm. broad, the rameal smaller: pubescence on the peduncles and on the involucral bracts fine and appressed; heads rather small, usually 7 to 10 mm. in diameter (exclusive of rays): rays 10 to 14, yellow, 4 to 12 mm. long: otherwise like *G. multiflora*. — *G. multiflora*, Gray, Syn. fl., 1, pt. 2, 269, in part, not Benth. and Hook. f. *G. multiflora*, var. *annua*, Jones, Proc. Calif. acad. sci., ser. 2, 5, 698. *Heliomeris multiflora*, Gray, Pl. Fendl., 84, as to pl. of Wislizenus; Pl. Wright., 2, 87, in part, not Nutt. — W. Texas, *Wright*, no. 334, *Pope*; New Mexico, on sides of mountains near the copper mines, *Wright*; Arizona, on sandy river bottoms, near Ft. Whipple, *Coues* and *Palmer*, no. 559; at Patano, *Pringle*; near Defiance, *Marsh*, no. 229; Arizona, *Knowlton*, no. 283, *Wilcox*, no. 455, *Rothrock*, no. 779; Mexico, at Llanos, *Wislizenus*; in Sonora, *Wright*, no. 1220, *F. E. Lloyd*, nos. 410, 411. Distinguished from *G. multiflora* by its annual root, much narrower leaves, somewhat smaller heads, shorter rays and distinctly Sonoran range; from *G. hispida*, var. *ciliata* less satisfactorily by the different pubescence of its leaves and involucral scales.

10. **G. hispida**. Probably annual, 6 to 8 dm. high, densely hispid and hoary throughout with long stiff white hairs, those of the stem and peduncles widely spreading: leaves alternate, narrow, linear, 5 to 7 cm. long, 3 or 4 mm. broad, thickish, channeled above: involucral bracts considerably exceeding the disk, hirsute and hoary: flowers as in *G. multiflora*. — *Heliomeris multiflora*, var. *hispida*, Gray, Pl. Wright., 2, 87, as to typical canescent form. — Low damp soil, near Sta. Cruz and San Bernardino, Sonora, *Wright*, no. 1220 in part. In the almost shaggy pubescence of the leaves and copious spreading pubescence of the peduncles this form differs rather markedly from the others here enumerated, but it certainly passes to

var. ciliata. Slender annual, commonly branched from the base, 3 to 6 dm. high: stems with sparse spreading pubescence or nearly glabrous below: leaves linear, green, conspicuously ciliate

for the greater part of their length: pubescence of the peduncles sparing, mostly appressed; involucral scales ciliate but scarcely pubescent otherwise. — *Heliomeris multiflora*, var. *hispida*, Gray, l. c., in part, i. e., as to greener forms. — S. Utah at Beaver, *Palmer*, no. 245; New Mexico, Zuni Mts., *Sitgreaves Exp.*, San Antonita, *Bigelow* in part; S. California at Sta. Monica, *Hasse*; Sonora, Mexico, *Wright*, no. 1222 in part.

* * Heads small or medium-sized; involucral scales linear and acute or the inner narrowly oblong and obtusish: leaves ovate or ovate-lanceolate: perennials so far as the duration is known.

+ Heads small and numerous, corymbose at the ends of the branches: leaves petioled (shortly so in var. *abbreviata*).

++ Leaves distinctly serrate.

= Pappus none: Mexico to Venezuela.

11. G. PATENS, Gray. Smoothish: stems flexuous, reclining, becoming 5 m. in length, at length soft-woody at the base, striate-angulate, sparingly and minutely appressed-pubescent; leaves ovate, acuminate, serrate, thin, obliquely truncate at the base, finely pubescent, more or less scabrous above; petioles slender, 1 to 3.2 cm. long; peduncles slender, finely appressed-pubescent; involucre cylindric, 5 mm. in diameter; outer scales lanceolate acute or attenuate, the inner longer, oblong, striate, obtusish: ligules 6 to 10, 1 cm. long, yellow turning whitish during or after drying; disk-flowers, 30 to 35. — Proc. Amer. acad., 5, 182; Hemsl., Biol. Cent.-Amer. Bot., 2, 163. ? *Wedelia cordata*, Hook. and Arn., Bot. Beech., 435. *Microcephalum ehrenbergianum*, Sch. Bip., and *Gymnolomia ehrenbergiana*, Klatt, Leopoldina, 23, 90. *Montanoa thomasii*, Klatt, Abh. naturf. gesell. Halle, 15, 328. — State of San Luis Potosi, *Palmer*, no. 1099, *Pringle*, no. 3937; Orizaba, *Schaffner*, *Botteri*, no. 497, 810, *Thomas*; Wartenberg in Huasteca, *Ervendberg*, no. 95; Oaxaca, El Pariánetla, *Conzatti* and *González*, no. 906; Guatemala, *von Tuerckheim*, no. 287.

var. ABBREVIATA, Robinson and Greenman. Stems 1 to 2 m. long, sparingly appressed-pubescent: petioles very short, 4 to 6 mm. in length; leaves somewhat narrower and thicker than in the type: pappus none. — Proc. Amer. acad., 29, 387. — Jalisco at Tequila, *Pringle*, no. 4595; Guerrero, between Chilapa and Tixtla, altitude 1,600 to 2,100 m., *E. W. Nelson*, no. 2164.

var. guatemalensis. With copious spreading pubescence on the stem: pedicels 1 to 2.5 cm. long: pappus none. — Guatemala,

San Miguel Uspantán, Dept. Quiché, *Heyde and Lux*, no. 3370 of Mr. J. Donnell Smith's sets.

var. brachypoda. Pubescence, at least on the upper part of the stem, spreading: pedicels very short (2 to 5 mm. in length): pappus none. — Guatemala, Alta Verapaz, altitude 1,300 m., *von Tuerckheim*, no. 852 of Mr. J. Donnell Smith's sets; also in Colima, S. W. Mexico, *Palmer*, no. 1223 (coll. of 1891).

var. macrophylla. Pubescence of the stem copious, spreading: leaves (1.5 dm. long, 8 to 10 cm. broad) much larger than in the other forms of the species, subcrenately serrate: pappus none. — Venezuela near Tovar, at 1,000 m. altitude, *Fendler*, no. 686.

12. G. COSTARICENSIS, Benth. Habit, foliage, and pubescence as in *G. patens*: heads larger (disk-flowers about 50); involucre campanulate: pubescence fine, appressed or subappressed: rays about 10: achenes of the disk-flowers destitute of pappus but sometimes crowned with an obscure ring or rim. — Benth. acc. to Klatt, Bull. soc. bot. Belg., 31, 199, at least as to pl. of Oersted (Pittier's no. 2614, referred to this species by Klatt, is, in herb. Klatt, *Baltimora scolosperum*, Steetz!). *G. rudbeckioides*, Hemsl., Biol. Cent.-Amer. Bot., 2, 163, in part, probably not HBK. *Gymnopsis? costaricensis*, Benth. in Oerst., Vidensk. meddel., 1852, p. 90. *G. vulcanica*, Steetz in Seem. Bot. herald, 157. *Aspilia costaricensis*, Klatt, l. c., 201, as to synon. and Pittier's no. 3276 in part. — Costa Rica, Aguacate, and Ujaras, *Oersted*; Rodeo de Pacaca, *Pittier*, no. 3276 in part, San Francisco de Guadalupe, *Tonduz*, nos. 7251, 7288; Rio Maria near S. José, *Tonduz*, no. 7271; Panama Boquete, Veraguas, *Seemann*, no. 1588.

= = Pappus none: Peruvian.

13. G. RUDBECKIOIDES, HBK. Of habit and foliage of the last two species but with short petioles (4 to 6 mm. long), spreading pubescence, and (ex icon.) more axillary or irregular (less definitely corymbose) inflorescence. — Nov. gen. et spec., 4, 219, t. 374. — Temperate regions, Agavaca, Peru, *Humboldt* and *Bonpland*. Not seen by the writers, who have been unable to match satisfactorily the original description and figure of this species with any Mexican or Central American plant.

= = = A definite pappus present, consisting of several fimbriate scales.

14. ? G. SUBFLEXUOSA, Benth. and Hook. f. Habit, foliage, pubescence, and inflorescence much as in *G. patens*, from which we are

able to separate it solely by the pappus.— Gen., 2, 364; Hemsl., l. c., 163. *Wedelia subflexuosa*, Hook. and Arn., Bot. Beech., 435.— Realejo, Nicaragua, *Sinclair*; Orizaba, *Botteri*, no. 435 (acc. to Hemsl.). To this species of which we have seen but a single achene we refer with doubt specimens from the following localities: Vera Cruz, Valley of Cordova, *Bourgeau*, no. 1961; Oaxaca, Jayacatlan, *L. C. Smith*, no. 896, Monte Alban, *Pringle*, no. 4859, *C. L. Smith*, no. 244, Valley of Etla, *L. C. Smith*, no. 849, *Alvarez*, no. 723; Costa Rica, Prov. of San José, *J. Donnell Smith*, no. 4871. A better knowledge of the type of this species will doubtless justify at least a varietal separation of some of the specimens here mentioned.

++ ++ Leaves entire or nearly so, canescent-sericeous beneath.

15. G. CANESCENS, Robinson. Leaves opposite, ovate, subtruncate or subcordate at the base, acute or often obtuse at the apex, finely gray pubescent above, silky and silvery beneath; petioles 2 cm. long: branches of the naked inflorescence long, bearing few clustered heads at their ends. — Proc. Amer. acad., 27, 174. — San Luis Potosi, brackish marsh, Las Tablas, *Pringle*, no. 3611, alkaline plains, Hacienda de Angosture, *Pringle*, no. 3763.

+ + Heads somewhat larger (of medium size) rather few, mostly solitary or borne by 3's at the ends of the branches.

+ Outer bracts of the involucre shorter than or little exceeding the inner: species of Mexico, Cent. America, and Andean South America.

= Leaves sessile or petioles short (2 to 8 mm. long).

a. Pappus none: species of Mexico.

16. G. OVATA, Gray. Stem 4 to 8 dm. long or more, covered with a short spreading pubescence: leaves ovate, subsessile, 3 to 7 cm. long, 2 to 4 cm. broad, serrate, mostly acute: heads 3 to 8, long, unequally long-peduncled, 1.5 to 1.8 cm. in diameter (exclusive of rays), many-flowered; the bracts of the involucre narrow, loose, very numerous.— Proc. Amer. acad., 19, 4.— Chiapas, *Ghiesbreght*, no. 554; Oaxaca, Sierra de San Filipe, altitude 1,800 to 2,500 m., *Pringle*, no. 5674, *Conzatti* and *González*, no. 551.

17. G. LIEBMANNII, Klatt. Smaller: leaves sessile, cordate, green on both sides, 2 cm. long, nearly as broad: heads few, 1 or 2 or perhaps 3 at the ends of the branches; involucres 6 mm. in diameter; bracts 2-seriate, rather few, lanceolate; rays about 9, conspicuously 5-nerved. — Leopoldina, 23, 90. *Microcephalum lieb-*

mannii, Sch. Bip., acc. to Klatt, l. c.— S. Andres, Mecatlan, Mexico, *Liebmann*, no. 588. Type in the herbarium of the Botanic garden of Copenhagen; a tracing and fragment in herb. Gray.

*. A rudimentary pappus generally present as a short-fringed cup: South American species.

18. G. TENELLA, HBK. Prostrate, much-branched: stems slender, hard: leaves opposite, ovate, subcordate, obtusish, thick, rugose, very scabrous above, short-petioled, serrate or serrulate, 2 to 5 cm. long: heads solitary, terminal, on filiform peduncles; involucre 8 to 10 mm. in diameter; the bracts oblong-lanceolate, canescent-pubescent; disk achenes obovate, appressed-pubescent, somewhat contracted above into the at length obscure pappus-cup. — Nov. gen. et spec., 4, 218, t. 373; Klatt in Engl. Jahrb., 8, 42. — New Granada near Ibague and Contreras, *Humboldt*; in bushy undergrowths and on savannas of the Rio Dagua, Cauca, altitude 1,000 to 1,800 m., *Lehmann*, nos. 1956, 2865, 2994.

19. G. HONDENSIS, HBK., l. c., 218. From description close to if not identical with the preceding: leaves said to be subacuminate at the apex and rounded at the base. — Torrid regions of New Grenada near Honda, *Humboldt*. Sprengel (Syst., 3, 610) reduces this species to *G. tenella*, where it may well belong.

20. G. TRIPLINERVIA, HBK. Branches terete. smooth, glabrate, the younger with appressed pilosity: leaves opposite, ovate, narrowly subacuminate, acute at the base, crenate-dentate, reticulate-veiny, 3-nerved, hispidulous with appressed hairs on both surfaces, about 6 cm. long, half as broad; petioles 6 to 8 mm. long: heads solitary on long appressed-pubescent peduncles; involucral bracts numerous, appressed-pubescent, the outer slightly exceeding the inner: disk-flowers and achenes unknown. — Nov. gen. et spec., 4, 219. — On high plains of Bogota, U. S. Colombia, *Humboldt*. Not seen by the writers, the descr. compiled.

= = Petioles longer (8 to 20 mm. in length): ligules rather showy, 1 to 2 cm. long.

a Rays about 12. narrow, strongly carinate or conduplicate.

21. G. CRUCIATA, Klatt. Tall erect shrub, 3 m. high: branches tetragonal, rough: leaves ovate-oblong, shortly cuneate or one-sided at the base, 7 cm. in length, half as broad; the petioles 1 cm. long: rays about 12. — Bull. Herb. Boiss., 4, 480. — Near Castañal, U. S. Colombia, *Sonntag*, no. 3, June, 1888. Type in herb. Univ. of Zurich; a head and sketch in herb. Gray.

b. Rays 8 to 10, not conspicuously carinate or conduplicate: South American.

22. G. QUITENSIS, Benth. and Hook. f. Shrub with rather copious pubescence: leaves all opposite, acuminate, from subcordate to shortly cuneate at the base, 4 to 9 cm. long, half as broad: heads cymose, the peduncles rather short, 2 to 2.5 cm. long, much exceeded by the leaves. — Gen., 2, 364. *Andrieuxia quitensis*, Benth., Pl. Hartw., 206. — Andes of Ecuador, *Hartweg*, no. 1142, *Hall, Couthouy.*

++ Outer bracts of the involucre elongated, the inner short: species of Central Brazil.

23. G. KUNTHIANA, Baker. Erect perennial pubescent herb: leaves petiolate, ovate, serrate, the upper alternate: involucre 1 to 1.2 cm. in diameter; outer bracts oblong, large, unequal, acute, 1.2 to 2.4 cm. long: ligules 10 to 15. — Baker in Mart. Fl. Bras., 6, pt. 3, 172. *Gymnopsis kunthiana*, Gardner in Hook. Lond. journ. bot., 7, 292. — Dry mountainous regions near Conceiçâo Goyaz, Brazil, *Gardner*, no. 3846.

* * * Heads and involucres as in the last group: leaves (all opposite) narrowly lanceolate: pappus none: South American.

+ Pedicels bracteolate.

24. G. GOEBELII, Klatt. Finely and cinereously appressed-pubescent: leaves rather small: branches terminated by 3-headed cymes; pedicels long and slender, bearing above the middle two subulate bractlets; heads 1.2 to 1.5 cm. broad exclusive of the 16 to 20 narrow linear rays. — Klatt in Goebel, Pflanzenbiologische schilderungen, 2, 49. — Dry slopes near the small town of Muruchies, Venezuela, *K. Goebel.*

+ + Pedicels naked.

25. G. HIRSUTA, Klatt. Branching shrub, scarcely or not at all canescent: leaves long-lanceolate, caudate-attenuate, obtusish at the base, 7 cm. long, 1.5 cm. broad, bullate-rugose above, veiny and pubescent beneath: ligules about 12, oblong, 5 mm. broad. — Klatt in Engl. Jahrb., 8, 42 (1886). — Among shrubs, borders of woods, Tungu-ragua, Ecuador, altitude 2,200 m., *Lehmann*, October, 1879, no. 360 a.

* * * * Heads large, but ligules short; involucral scales oblong, the tips slightly squarrose; peduncles long: leaves oblong or elliptic, sessile, harsh in texture and hirsute: perennial herb.

26. G. PARKINSONII, Hemsl. Erect, coarsely pubescent and

scabrous: leaves alternate or scattered (the middle ones occasionally verticillate), 6 to 13 cm. long, 1.2 to 3.4 cm. broad, prominently 3-nerved: heads on long stout ascending alternate peduncles, subglobose, 2 to 2.5 cm. in diameter. — Biol. Cent.-Amer. Bot., 2, 163. *G. rudis*, Gray, Proc. Amer. acad., 22, 424. *G. rudis*, var. *minor*, Rob. and Greenm., ibid, 29, 387 (small form). — The type (in herb. Kew), collected in Mexico, without locality, by *Parkinson*, has brownish-purple flowers. This form is represented also by *Palmer's* no. 531 from the Rio Blanco, Jalisco, *Pringle's* no. 4584 from rocky hills near Tequila (small form), and *Rose's* no. 3031, coll. between Bolaños and Guadalajara, and no. 3700 coll. at Bolaños. This typical form is connected by variegated transitions with a forma **flaviflora** in which both disk- and ray-flowers are golden yellow. The latter form is represented by *Pringle's* no. 2460, from hillsides near Guadalajara, *Palmer's* no. 533 from the Rio Blanco, and *Rose's* no. 2827, coll. between Colotlan and Bolaños, Jalisco. No morphological differences between the individuals with brown-purple flowers and those with yellow flowers have been detected.

* * * * * Heads large (1.6 to 1.8 cm. broad excl. of rays), terminal, solitary; involucral bracts narrow, lance-linear, attenuate: rays long: leaves lance-oblong.

27. **G. serrata**. Perennial: stems several, 5 dm. high, unbranched, striate, terete, puberulent, leafy, 1 (-2)- headed: leaves lance-oblong, opposite or alternate, attenuate, conspicuously serrate, shortly petiolate, scabrous-puberulent above, scarcely paler, pubescent, and reticulate veiny beneath, 6 to 12 cm. long, 1 to 2 cm. broad: involucral bracts herbaceous, lance-linear, attenuate, appressed-canescent-pubescent especially on the mid-nerve, 1 to 1.2 cm. long: rays deep yellow, oblong, 1.5 to 2.5 cm. long, 5 to 8 mm. broad: disk-corollas yellow, essentially glabrous, 6 mm. long: immature achenes 4 mm. long, glabrous, destitute of pappus. — Collected in S. W. Chihuahua on Mt. Mohinora, 1 September, 1898, *E. W. Nelson*, no. 4891. Types in herb. U. S. nat. museum and herb. Gray.

* * * * * * Heads of medium size, most of them sessile or shortly peduncled in few many-headed leafy corymbs: involucral bracts ovate, obtuse, conspicuously squarrose: leaves ovate, sessile.

28. G. SQUARROSA, Benth. and Hook. f. Erect perennial herb, simple below, coarsely and copiously pubescent: leaves serrate

scabrous above, paler and somewhat canescent-pubescent beneath, 5 to 7 cm. long: ligules (about 13) 1 to 1.3 cm. long.—Gen., 2, 362; Hemsl., l. c.; Gray in Wats., Proc. Amer. acad., 22, 424. *Zaluzania squarrosa*, Sch. Bip., Flora, 1864, p. 217. — Ravines near Guadalajara, Jalisco, *Oliva* (1854), *Palmer*, nos. 486, 741 (1886), *Pringle*, nos. 2194, 2474 (1888–89). Flowering from September to November.

* * * * * * * Heads small or medium-sized, slender-peduncled: involucral bracts (all but a few of the outermost) broad, obovate or oblong, mostly obtuse or rounded at the apex: leaves ovate or lanceolate to linear-oblong.

+ Scales of the involucre not canescent.

29. G. LATIBRACTEATA, Hemsl. Stems terete, striate, purple, alternately branched above, sparingly scabrous-pubescent: leaves alternate (so far as known), lanceolate, attenuate at each end, short-petioled, obsoletely serrate, 6 to 8 ("to 13") cm. long, 1 to 3 cm. broad: peduncles 5 to 7 cm. long, 1-headed; heads (excl. of ligules), 1.5 cm. in diameter; involucre campanulate: rays few, 1.2 to 1.4 cm. long.— Hemsl., l. c., 162. — Cerro Pinar, North Mexico, *Seemann*, no. 1485. Collected but once.

+ + Scales of the involucre canescent.

30. G. ENSIFOLIA, Benth. and Hook. f. Stems slender, terete, strigillose, and scabrous: leaves opposite, sword-shaped, 1 to 1.2 dm. long, 1 to 1.5 cm. broad, gradually narrowed from near the sessile base to the attenuate apex, very scabrous above, pale beneath: heads cymose; involucral scales all rounded at the apex, the outer much shorter. — Gen., 2, 364; Hemsl., l. c., 161. *Montagnea ensifolia*, Sch. Bip. in Seem. Bot. herald, 304. *Zaluzania ensifolia*, Sch. Bip., Flora, 1864, p. 216. — Sierra Madre, Northern Mexico, *Seemann*, no. 2007 in part; Tepic, *Palmer* (coll. of 1892).

31. G. SERICEA, Klatt. "Suffrutescent": leaves chiefly opposite, ovate, shortly connate-petiolate, entire, 3-nerved, acute, acuminate, 3 to 4 cm. long, half as broad, above green and scabrous, beneath silky canescent: heads 1.2 cm. in diameter; involucral bracts biseriate, oblong, subequal: rays about 20, narrowly oblong. — Leopoldina, 23, 90. *Microcephalum sericeum*, Sch. Bip. acc. to Klatt, l. c. — Mexico, without locality, *Liebmann*, no. 609. Type in herb. Botanic garden of Copenhagen; excellent drawing and some fragments in herb. Gray.

* * * * * * * * * Heads large (1.7 to 7 cm. broad excl. of rays); involucral bracts broad, the inner large, spatulate with rounded apex: perennial herbs: leaves lanceolate to oblong or ovate; petioles short winged, or almost none.

+ Leaves oblong-lanceolate, pale beneath.

32. G. GHIESBREGHTII, Hemsl. Erect, simple or branched from the base, 6 to 15 dm. high: leaves all alternate or some opposite, serrate or serrulate, mostly acute at each end, 5 to 10 cm. long, 1 to 4 cm. broad: heads few, 2 to 2.5 cm. in diameter; outer scales short, squarrose: ligules about 20, golden yellow, 2 cm. long. — Hemsl., l. c., 162.— South Mexico, hills of Oaxaca, *Ghiesbreght*, nos. 385 (acc. to Hemsl.), 382, *Pringle*, no. 4963, *E. W. Nelson*, nos. 1371, 1464, *L. C. Smith*, no. 799, *Conzutti* and *González*, no. 553; Michoacan on wooded hills near Patzcuaro, *Pringle*, no. 3339.

+ + Leaves elliptical, green beneath.

33. G. DECUMBENS, Robinson. Stems several from a lignescent stock, decumbent, 4 to 5 dm. long: leaves chiefly opposite, 2.5 to 4 cm. long, half as broad, scabrous upon both surfaces: heads solitary or borne by threes at the summit of each stem; outer scales of the involucre ovate-lanceolate, acute, not squarrose, dark colored, covered with appressed white hairs. — Proc. Amer. acad., 26, 165. — Rocky hills, Tultenango, State of Mexico, *Pringle*, no. 3263 in part; Zacatecas between Bolaños and Guadalajara, *Rose*, no. 3044 (leaves somewhat longer).

The achenes of this species are perfectly glabrous, obovate-oblong, strongly compressed, striate, and completely destitute of pappus. It is now found that another plant of astonishing similarity was also collected and distributed under the type number (Pringle's no. 3263). While in all observed external characters it cannot be distinguished from the former, it has thick obtusely 4-angled mottled and pubescent achenes which are crowned with 2 (to 4) paleaceous awns and intermediate scales. The latter plant seems to be identical with *Viguiera ghiesbreghtii*, Gray.

+ + + Leaves ovate, large and broad.

++ Petioles not auricled.

= Outer involucral bracts large, squarrosely spreading or reflexed, about as long as the inner ones, acute or acuminate.

34. G. FLAVA, Hemsl. Stems strigillose becoming hirsute with coarse spreading hairs toward the summit and upon the peduncles:

leaves 7 to 10 cm. long, 2 to 3 cm. broad, above scabrous, beneath hirsute upon the veins and finely canescent-pubescent upon the surface: heads (excl. the rays) 2.5 to 3.5 cm. in diameter: ligules about 15. — Hemsl., l. c., 161. — Oaxaca, *Ghiesbreght*, no. 216 (type in herb. Kew). We follow Dr. Gray in referring to this species *Ghiesbreght's* no. 383, from which the above characterization is drawn.

35. **G. megacephala**. Stems simple, striate, scarcely at all scabrous, covered with minute appressed hairs, also lanate in lines decurrent each from either side of the short winged petioles: leaves ovate-lanceolate with short slender caudate acumination, serrate, scabrous above, hirsutulous upon the veins, but green and glabrous upon the surface beneath, 8 to 12 cm. long, 2 to 4.5 cm. broad: heads terminal, solitary, about 7 cm. broad: no rays observed. — Collected between Tlapa and Ayusinapa, Guerrero, Mexico, altitude 1,380 to 1,700 m., 13 December, 1894, *E. W. Nelson*, no. 2105, distributed as *G. flava*.

var. **simulans**. Pubescence of the stem coarser, spreading: bases of the hairs enlarged, white, tuberculate: leaves somewhat larger, less pubescent, merely cuspidate at the obtusish tip: rays about 13, oblong, bright yellow, 3 cm. long, 7 to 10 mm. broad. — Collected on the Sierra de los Morones near Plateado, Zacatecas, altitude 2,300 m. 1 September, 1897, *Dr. J. N. Rose*, no. 2740. This variety closely simulates *Viguiera excelsa*, Benth. and Hook.f., which, however, differs technically and, as it appears, with constancy in its pubescent achenes which bear at the summit two conspicuous awns and some intermediate scales.

= = Outer involucral bracts much shorter than the large inner ones.

36. G. PLATYLEPIS, Gray. Hirsute shrub, 1 to 3 m. high: leaves chiefly opposite, acuminate or attenuate at each end, very scabrous above, paler and densely soft-pubescent beneath, 1 dm. long, 3-nerved from considerably above the base: peduncles thickened upwards; heads (excl. of rays) 2 to 3 cm. in diameter; ligules 15 to 20 in number, 2 to 3 cm. long. — Proc. Amer. acad., 19, 5; Klatt, Bull. soc. bot. Belg., 31, 199. *G. decurrens*, Klatt, Leopoldina, 23, 90. *Perimeniopsis perfoliata*, Sch. Bip., acc. to Klatt, l. c. *Tithonia scaberrima*, Benth. in Oerst., Vidensk. meddel., 1852, p. 91. *T. platylepis*, Sch. Bip., acc. to Benth. and Hook. f., l. c., 368 (name only). *Mirasolia scaberrima*, Benth. and Hook. f.

acc. to Hemsl., l. c., 168. — South Mexico, Mirador, *Liebmann*, no. 251; Chiapas, *Ghiesbreght*, no. 572, Caec. and Ed. Seler, no. 2187; Valley of Cordova, *Bourgeau*, no. 1851; Vera Cruz, *Pringle*, no. 6087; Orizaba, *Gray*; Guatemala, *von Tuerckheim*, no. 354 of Mr. J. Donnell Smith's sets; Costa Rica, *Pittier*, nos. 3136, 3735, *Tonduz*, no. 7196.

++ Cuneately winged petioles tending to enlargement and usually auricled at the base.

37. G. CALVA, Gray. Shaggy-pubescent with long white silky hairs: habit as in *Tithonia*: leaves alternate, broadly ovate, acuminate, abruptly contracted to winged and (sometimes obsoletely) auriculate petioles: involucre hirsute. — Proc. Amer. acad., 19, 5; Hook. f. and Jacks., Ind. Kew., 1, 1076. *Tithonia calva*, Sch. Bip. in Seemann, l. c., 305. *Mirasolia calva*, Benth. and Hook. f., Gen., 2, 368; Hemsl., l. c., 168. Sierra Madre, Northern Mexico, *Seemann*, no. 2045; Durango, *Rose*, no. 2293.

var. lancifolia. Stem sparingly hirsute or villous: leaves lanceolate. — Tepic, Acaponeta, February, 1895, *F. H. Lamb*, no. 539. Types in herb. Gray and herb. U. S. nat. museum.

DOUBTFUL SPECIES.

G. CONNATA, Spreng., Syst. 3, 610 (*connatum*). — Branches hispid: leaves oblong, attenuate at either end, connate, hispidulous: pedunceles terminal, short: foliaceous involucre subsimple. — Brazil, *Sello*. A species not mentioned in Martius, Fl. Bras., and probably not of this genus. The description is a translation of the original characterization.

G. MICROCEPHALA, Less. Herb with 3-nerved leaves, small cylindrical discoid short-pedicelled heads: leaves petiolate, opposite, paler beneath, oblong-ovate, long-acuminate, very obtuse at the base, sharply serrate, hirsute-hispid, scabrous, 3.1 to 5 cm. long, 1 to 3 cm. broad: scales of the involucre passing from flat semilanceolate foliaceous bracts, hirsute on the midnerve, to longer (about 4 mm. long) and broader dry linear shortly acuminate glabrous bracts, fimbriate-dentate at the apex, scarious on the margin, and traversed by green nerves: branches opposite, diverging at the apex into 3 short filiform branchlets bearing several heads (4 mm. long) above. — Linnaea, 5, 153, whence the foregoing description is

translated. — Near Hacienda de la Laguna, October, *Schiede* and *Deppe*; also Cordillera of Oaxaca, *Galeotti*, no. 2090 (acc. to Hemsl.). Exceptional in its discoid heads and perhaps not of this genus.

Transferred or suppressed species.

G. DECURRENS, Klatt, Leopoldina, 23, 90, is *G. platylepis*, Gray, — an identity recognized by Dr. Klatt himself as shown by a manuscript note in his herbarium.

G. EHRENBERGIANA, Klatt, Leopoldina, 23, 90, is *G. patens*, Gray.

G. RUDIS, Gray (in Wats., Proc. Amer. acad., 22, 424) is *G. parkinsonii*, Hemsl., Biol. Cent.-Amer. Bot., 2, 163, — an identity kindly verified by Mr. Hemsley by comparison of the types.

G. SILVATICA, Klatt, Leopoldina, 25, 104 (1889); Bull. soc. bot. Belg., 31, 199 (1892). Representing this species in the Klatt herbarium we find two specimens collected by Lehmann at Cuenca, altitude 2,000 m., 16 October, 1879, Pittier's no. 6987, collected at San Rafael de Carthago, altitude 1,500 m., 28 August, 1892, and an excellent drawing of a specimen collected at Mt. Irazu, Costa Rica, by Dr. Hoffman. All of these appear to be identical and to agree in all more conspicuous characters with the original description. Nevertheless, careful dissections show that the ray-achenes are fertile and the ligules sessile indicating that the species is a Heliopsis.

G. TRILOBA, Gray, with fertile ray-flowers and an unequal scale-like pappus, is certainly a Zaluzania. The specific name *triloba* having been used in the latter genus the species may be transferred as **Z. grayiana**, n. comb.

G. TRIPLINERVIA, Klatt, in Engl. Jahrb., 8, 42 (not HBK.), is a Heliopsis, the ray-flowers being distinctly pistillate and fertile, while the ligules are sessile, not contracted into a slender tube at the base.

GYMNOPSIS VERBESINOIDES, DC. (Prodr., 5, 561) of the Island of Trinidad is an Aspilia.

GYMNOPSIS VULCANICA, Steetz in Seem. Bot. herald, 157, appears from the description and the examination of a single head to be *Gymnolomia costaricensis*, Benth.

2. SUPPLEMENTARY NOTES UPON CALEA, TRIDAX, AND MIKANIA.

Some years ago the writers (Proc. Amer. acad., 32, 1–30) published revisions of the genera Calea, Tridax, and Mikania. These synopses were based chiefly upon the representation of the genera in the Gray herbarium, and considerable difficulty was naturally experienced in the exact placing of some of the species of European writers whose types were not readily available for examination. The recent acquisition of the Klatt collection by the Gray herbarium does much to remove these difficulties and puts the writers in a position to add the following corrections and supplementary notes upon their former revision.

Calea peduncularis, var. longifolia, Gray. Dr. Rose's no. 2730, from the Sierra de los Morones, near Plateado in the State of Zacatecas, corresponds closely with *Calea peduncularis*, var. *longifolia*, Gray, but has pappus, thus showing that the achenes of this variety are no more constant in regard to pappus than those of the more typical forms of the species. The variety is, however, readily distinguished by its long leaves.

C. perforata, Klatt, Leopoldina, 20, 95, has immature heads but is otherwise like Fendler's no. 637 (from Tovar, Venezuela) which was relegated without question by Schultz Bipontinus to *C. solidaginea*, HBK. On comparing Dr. Klatt's type (coll. on the Mayquetea River by Edw. Otto, no. 459) with Kunth's description and plate (HBK., Nov. gen. et spec., 4, 295, t. 407) we can find no significant difference.

C. densiflora, Klatt, Leopoldina, 20, 96, is *Ageratum conyzoides*, L.

C. pellucidinervia, Klatt, Bull. soc. bot. Belg., 31, 207, is not to be satisfactorily distinguished from *C. axillaris*, DC.

C. axillaris, DC. To this species should also be referred *C. prunifolia*, Klatt, l. c., 208. in part (as to Pittier's nos. 3219, 3695, 4520, 4938, and 7023), not HBK. The distinctions between *C. axillaris* and its variety *urticaefolia* seem to be scarcely worthy of recognition.

C. pittieri sp. n. Shrub with slender flexuous terete puberulent or toward the end tomentulose branches: leaves ovate to elliptic, thickish, crenate-serrate, acutish, 4.5 to 7.5 cm. long, 2.5

to 3.7 cm. broad, rugose and very scabrous above, veiny grayish-tomentose and resinous-dotted beneath, 5-nerved from near the obtuse or subcordate base; petioles 6 to 9 mm. long, covered with a fine fuscous pubescence: heads numerous, rather small, discoid; pedicels filiform, 1 to 1.2 cm. long, some fascicled in the upper axils but most of them in regular hemispherical umbelliform leafy-bracted clusters (4 to 5 cm. in diameter) at the ends of the branches; involucre cylindric-ovoid, somewhat turbinate at the base, the outer scales very short, linear-oblong to narrowly ovate, herbaceous, tomentulose, the intermediate oblong, obtuse, often erose and squarrose at the tip, the inner lance-oblong, acute, bright yellow, petaloid: achenes narrowly fusiform, angled, 2.7 mm. long, callose at the base, covered with short spreading gray hairs; pappus-awns about 20, narrow, attenuate, 4.6 mm. long. — *C. prunifolia*, Klatt, Bull. soc. bot. Belg., 31, 208, in part, not HBK. — Costa Rica, banks of the Rio Ceibo near Buenos Ayres, altitude 200 m., January, 1892, *Prof. H. Pittier*, no. 4913, Chemin de la Caldera between San Mateo and San Ramon, *P. Biolley*, 25 January, 1892, no. 7015; also by *Prof. Pittier* in woods at Boruca, altitude 450 m., February, 1891. *C. prunifolia*, HBK., to which this plant was referred by Dr. Klatt, has larger leaves nearly or quite smooth and somewhat coriaceous. It also differs in the calyculate bractlets of the involucre, which are suborbicular and of larger size.

C. GRAYII, Klatt, Leopoldina, 20, 96, overlooked in our revision, should replace *C. tomentosa*, Gray, not Gardner.

C. TERNIFOLIA, Oliver, Trans. Linn. soc. ser. 2, 2, 277, t. 43, figs. 9–16 (1886). For this species the name of which is antedated by *C. ternifolia*, HBK., Nov. gen. et spec., 4, 294, we would propose **C. oliverii**.

TRIDAX GALEOTTII, Klatt, l. c., at least as to the plant with lobed pilose leaves. *T. tuberosa*, Rob. and Greenm., Proc. Amer. acad., 32, 4. In the Klatt herbarium *T. galeottii* is represented by two sheets of well executed drawings. On one is an excellent representation of the plant we have called *T. tuberosa*, with lobed leaves, cuneate at the base and distinctly hirsute. On the other sheet two plants are represented, one being identical with that just mentioned, the other having the more oval serrate unlobed leaves of *T. brachylepis*, Hemsl. Dr. Klatt's description clearly shows that he had in mind the plant with lobed leaves. The description, however, is quite in error as to the involucral scales being 2-seriate. They are clearly

3–4-seriate in both his drawings and in a single authentic head preserved in a pocket on one of the sheets of drawings. In the arrangement of species *T. galeottii* should, accordingly, be inserted where *T. tuberosa* has been placed.

T. IMBRICATA, Sch. Bip. in Klatt, Flora, 1885, p. 202. *T. petrophila*, Rob. and Greenm. l. c., 5. The authentic specimen of *T. imbricata* in the Klatt herbarium is very poor, but sufficient to show with a fair degree of certainty the identity of *T. petrophila*. The involucre is here also 3–4-seriate, not biseriate as we had supposed.

T. VERTICILLATA, Klatt, Leopoldina, 25, 107 (1889). This South American species, omitted from our revision, is the only member of the genus with verticillate leaves. In the arrangement of the species it may well be placed in subgenus Eutridax after *T. angustifolia*.

T. EHRENBERGII, Sch. Bip. in Klatt, l. c. Klatt's drawing of this species shows a plant with long internodes and habit of *T. dubia*, but the achenes preserved in the Klatt herbarium have the pappus rather of a Calea than a Tridax. The species must remain doubtful until more complete material can be seen.

MIKANIA OLIVACEA, Klatt, Bull. soc. bot. Belg., 31, 195. — An examination of the type in the Klatt herbarium shows it to be Pittier's no. 4933, not 4433, as cited in the original publication of the species.

M. PUNCTATA, Klatt, l. c., originally described as having the heads 7-flowered, proves, on careful dissections of portions of the type material, to have uniformly 4 flowers in each head, fully agreeing in this regard with the other species of the genus.

M. FENDLERI, Klatt, Abh. naturf. gesellsch. Halle, 15, 324, although reduced in our revision to a synonym of *M. cordifolia*, Willd., is probably worthy of specific rank.

M. gonzalezii, sp. n. Vigorous smoothish twiner: branches obsoletely 6-angled, finely striate, glabrous: leaves large, thin, glabrous, ovate, entire, acute, broadly and shallowly cordate or subcordate, 5-nerved from the base, 4 to 12 cm. long, 3 to 10 cm. broad; petioles 1.5 to 5 cm. long: heads in an elongated open paniele with short opposite corymbiferous branches (5 to 15 cm. long); bracts of the inflorescence oblong lanceolate, petiolate; involucres 7 mm. long, subtended by shorter sessile oblong-elliptic or oval bractlets; pedicels puberulent under a lens; involucral

scales oblong, essentially glabrous except at the obtusish or barely acute tip: corolla 5 to 6 mm. long, about equalling the sordid pappus: achenes 4 mm. long, nearly glabrous. — Collected by *Prof. C. Conzatti* at Colonia Melchor Ocampo, Vera Cruz, Mexico, altitude 1,200 m., 8 December, 1895, no. 18, and by *Prof. C. Conzatti*, and *V. González* in Canton de Cordoba, Vera Cruz, 27 December, 1897, no. 637 in part. This noteworthy plant is clearly distinct from any Mexican species known to us, nor have we been successful in referring it to any South American species. In the genus it should, probably, be placed near *M. cordifolia*, from which, however, it differs in the size, form, texture, and glabrous character of the leaves, which are more or less nigrescent in drying. We take pleasure in dedicating the species to Mr. V. González, who as the able assistant of Professor Conzatti, has done much to further the knowledge of Mexican plants.

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Presented by B. L. Robinson, January 10, 1900. Received January 26, 1900.

I.—NEW SPECIES AND VARIETIES OF MEXICAN PLANTS.

By J. M. Greenman.

Spiranthes Nelsonii. Aphyllous: roots clustered, tuberous, densely covered with long hairs: stems 4 to 5.5 dm. high, clothed below with oblong-ovate short-acuminate white scarious overlapping glabrous nervate bracts, these somewhat more remote toward the inflorescence, glabrous below, above and throughout the inflorescence more or less glandular-pubescent: spikes oblong, 6 to 10 cm. long, about 2.5 cm. broad, rather closely flowered; bracts ovate, acuminate, shorter than the flowers: flowers sessile, about 2 cm. long, apparently white; the perianth later becoming reflexed or more or less folded on itself; the outer lateral divisions of the perianth or lateral sepals oblong, slightly expanded above the middle, 1.1 to 1.2 cm. long, 3.5 mm. broad, obtuse, the upper sepal similar but slightly larger; the inner lateral divisions of the perianth or lateral petals oblong-spatulate, about 1 cm. in length, obtuse, much narrowed toward the base; lip oblong-ligulate, 1.3 to 1.4 cm. long, 4 mm. broad, subtruncate or obtusish at the apex, cuneate at the base, callous-tuberculate on each side just above the base, bearing in the lower half on either side near the margins a thick or fleshy pubescent ridge; clinandrium pubescent along the free surface; anther broadly ovate, 3 mm. long, obtuse: beak of the stigma short-oblong, minutely 2-toothed at the apex; gland linear-oblong. — Collected by E. W. Nelson, between Rio Verde and Panixtlahuaca, Oaxaca, altitude 125 to 370 m., 25 February, 1895, no. 2384.

Spiranthes Pringlei, Watson, var. **minor.** Flowers green or greenish white, one-half to two-thirds as large as in the species proper; in technical characters and in general habit corresponding well with the type specimen of the species. — Collected by C. G. Pringle in grassy fields near Jalapa, altitude 1,225 m., 17, 21 May, 1899, no. 8197.

Spiranthes tenuiflora. Roots several, fleshy, tuberous: stems 3 to 6.5 dm. high, bearing at the base remnants of the old radical leaves, above clothed with alternate lanceolate-acuminate white scarious imbricated bracts or sheaths, these somewhat more remote toward the inflorescence: racemes 1 to 2 dm. long, many-flowered, somewhat glandular-pubescent; bracts ovate, lanceolate, acuminate, 3-nerved, shorter than the sessile slender flowers (2 cm. long): outer lateral divisions of the perianth lance-oblong, obtuse, 3-nerved, about 6 mm. long, 2 mm. broad, the upper sepal somewhat longer and broader than the lateral one; lateral petals narrowly lance-oblong, obtuse, shorter than and more or less connivent with the upper sepal; labellum in general outline oblong, about 7 mm. long, short-unguiculate, slightly hastate by a rather prominent tubercle on either side at the base, terminated by a broadly ovate-reniform acute somewhat turbinate conspicuous expansion, 5–7-nerved, bearing just above the hastate base minute papillae. — Collected by C. G. Pringle in lava fields near Cuernavaca, Morelos, altitude 1,525 m., 16 February, 1899, no. 6995. A very striking and characteristic species, readily recognized by the white showy bracts sheathing the stem, and by the elongated racemes with long slender more or less remote reddish or reddish-yellow sparingly glandular-pubescent flowers.

Hosackia repens, Don, Gen. Syst. of Gard. & Bot., ii. 200; Walp. Rep., ii. 855. Specimens collected by C. G. Pringle in ditches at Tlalpam, Valley of Mexico, 20 August, 1896, no. 7240, and by Dr. J. W. Harshberger, no. 170, are referred with little doubt to the above meagrely described and little understood species. As the specimens cited accord well with the brief characterization of Don, it seems best to take up the above name, and to present herewith the following amplified description. — An herbaceous perennial: stems repent or ascending, 3 to 7 dm. long, more or less branched, glabrous below, pubescent above: leaves including the petiole 2 to 6 cm. long, 5–9-foliolate; stipules triangular, acuminate, 2 to 5 mm. long; leaflets obovate-oblong, 1 to 2 cm. long, 4 to 8 mm. broad, obtuse, mucronate, narrowed below into a conspicuously blackened rather slender (1 mm. long) petiolule, green and glabrous above, somewhat paler and pubescent beneath: inflorescence corymbose on long slender peduncles, these 8 to 18 cm. in length, much exceeding the leaves; umbel usually 5-flowered, and subtended by a short-petioled 3–5-foliolate bract: flowers 1 to 1.4 cm. long, yellow, on short blackish pubescent pedicels: calyx-teeth lanceolate, 3 mm. long, about equalling the more or less reddish-maculate tube, both tube and calyx-teeth pubescent: standard obovate-oblong, slightly

retuse, abruptly narrowed below into a rather long claw: legume linear, about 3 cm. long, compressed, glabrous. In general appearance *H. repens*, Don, resembles *H. Torreyi*, Gray, but in the repent habit, the very long peduncles, and in the longer claw of the standard, as well as in the conspicuously blackened petiolules, it is quite different.

Hosackia oaxacana. An herbaceous perennial: stems erect or ascending, 1 to 2.5 dm. high, usually branched, glabrous: leaves including the short petioles 1.5 to 3 cm. long, 5–9-foliolate; stipules narrowly ovate, 3 to 5 mm. long, acute; leaflets somewhat rhombic-obovate or oblong-obovate, 0.5 to 1 cm. long, 3 to 6 mm. broad, obtuse or submucronate, green above, pale and somewhat glaucous beneath, having a few scattered hairs on the midrib beneath and on the margins, otherwise glabrous: peduncles usually exceeding the leaves, 2.5 to 5 cm. in length, glabrous; umbels 3–6-flowered, subtended by a nearly sessile 1–3-foliolate leaf-like bract: flowers purplish, 1.2 to 1.4 cm. long: calyx-teeth slightly unequal, triangular-ovate, 1.5 to 2 mm. long, acutish, sparingly pubescent, barely one half as long as the glabrous more or less purplish and somewhat glaucous tube; standard obovate, slightly retuse, narrowed below into a claw, not auricled at the base or subcordate: mature fruit not seen. — Collected by the late Rev. Lucius C. Smith, Sierra de Clavellinas, Oaxaca, altitude 3,000 m., 26 June, 1894, no. 57. The affinity of this species is perhaps with the Californian *H. gracilis*, Benth., but it is readily distinguished from it by the shorter petiolate leaves, the much shorter-petioled and less conspicuous leaf-like bract subtending the umbellate floral cluster, by the shorter broader and more obtuse calyx-lobes, and finally by the subcuneate rather than distinctly auricled or subcordate standard.

Arbutus glandulosa, Mart. & Gal. Bull. Acad. Brux. ix. 533 (reprint p. 5). This species, although originally described as having "sharply spinulose-denticulate" leaves, seems to vary considerably in the character of the leaf margin. It not infrequently happens that even on the same individual specimen one finds leaves from perfectly entire to sharply spinulose-dentate. This variation is well shown by Pringle's no. 8033, in herb. Gray. To this species may also be referred, as a form with entire or subentire leaves, Pringle's no. 8002, collected on the Sierra de Pachuca, 21 February, 1899.

Styrax Ramirezii, Greenm. Proc. Am. Acad. xxxiv. 568. This species, described from flowering specimens, has been collected in the fruiting stage by Mr. C. G. Pringle on the Sierra de Tepoxtlan, Morelos, altitude 2,300 m., 7 February, 1898, no. 8023. The fruit,

which emerges from the persistent cup-shaped calyx, is oblong, 1 to 1.5 cm. in length, 6 to 7 mm. thick, pale green and closely stellate-lepidote over the slightly corrugated surface.

Stemmadenia macrophylla. Stems covered with a grayish bark and dotted with lenticels: leaves oblong-obovate to oblong-lanceolate, including the petiole 1 to 2.5 dm. long, 4 to 7.5 cm. broad, acuminate, entire, narrowed below into a short (5 to 15 mm. long) petiole, glabrous upon each surface, dark green above, slightly paler beneath: inflorescence subracemose at the bifurcation of the branches, few-flowered; peduncles 3 cm. long: calyx deeply 5-parted, segments unequal, the two outer shorter, 4 to 5 mm. long, somewhat narrowed toward the apex, the inner oblong or slightly obovate-oblong, about 7 mm. long, rounded at the apex: corolla tubular-funnelform, about 6 cm. long, tube narrowed below, ampliated above, lobes spreading: fruit not seen. — Collected by H. von Tuerckheim at Pansamalá, Depart. Alta Verapaz, altitude 1,100 m., January, 1886, no. 981.

This number (no. 981) of Mr. John Donnell Smith's collection was originally distributed as "Odontadenia?" * and subsequently corrected to *Stemmadenia bignoniaeflora*, Miers, and under this name Donnell Smith's no. 1800 was also distributed. The latter species is characterized as having a calyx 1.3 to 1.5 cm. long. *Stemmadenia macrophylla* on the other hand has the calyx less than half this length; thus by the character of the calyx alone the two species may be readily distinguished.

Stemmadenia tomentosa. Shrub, 3 to 5 m. high: stems somewhat dichotomously branched above, covered with a grayish bark and dotted here and there with minute lenticels: leaves opposite, ovate-oblong, or slightly obovate, short-acuminate, entire, narrowed at the base into a short slender petiole, glabrous above, densely soft-tomentose beneath; petioles slightly connate below and forming with the persistent leaf scar a narrow ridge about the stem in the axil of which is a continuous row of minute glands similar to those of the calyx: rather close floral clusters terminating the branches: flowers large: calyx deeply 5-parted, lobes broadly ovate, acute, about 5 mm. long: corolla yellow, tubular-funnelform, greatly ampliated above, narrowed below, usually more or less twisted in the throat, and with large subrotund spreading lobes: mature fruit not seen. — Collected by C. G. Pringle in lava beds near Zapotlan, State of Jalisco, 19 May, 1893, no. 4370, and distributed as "*S. mollis*, Benth.?" The nearest ally of *S. tomentosa* is apparently

* See Donnell Smith, Enum. Pl. Guat. i. 26.

S. Palmeri, Rose, as shown by the calyx characters and by the general habit, but the former differs conspicuously from the latter by the presence of a dense tomentum over the entire lower surface of the leaves. The examination of a considerable number of specimens of *S. Palmeri* shows minute tufts of pubescence along the midrib on the lower surface of the leaves, otherwise the foliage is perfectly glabrous. This character seems to be fairly constant, and as no intergrading forms have yet been seen, it seems best to the writer, for the present at least, to regard Mr. Pringle's plant as a distinct species.

Physalis acuminata. Suffrutescent: stems dichotomously branched, glabrous below, glandular-viscid above: leaves single or in pairs, ovate, 4 to 10 cm. long, 2 to 6 cm. broad, acuminate, acute, entire, narrowed below into a slightly marginate glandular-viscid petiole, more or less glandular-pubescent upon both surfaces especially upon the midrib and veins beneath: pedicels 1 to 2 cm. long, later usually reflexed: calyx in anthesis 1.3 cm. long, densely glandular-pubescent; lobes ovate, acuminate: corolla large, 2.5 to 3 cm. in diameter when fully expanded, sinuately 5-lobed with short acutish lobes, and very shallow sinuses, ciliate, conspicuously maculate in 5 areas with numerous dark purple spots, densely pubescent at the base: filaments about equal, glabrous; anthers purplish: fruiting calyx ovate, about 4 cm. long, equally 10-angled; lobes convergent: berry 2 cm. in diameter, glabrous. — Collected by C. G. Pringle on the Sierra de las Cruces, State of Mexico, 23 October, 1892, no. 5315. Mr. Pringle's plant was at first doubtfully referred to *P. glutinosa*, Schl., but from this species it differs materially in the character of the foliage. The leaves are all entire and narrowed below into a petiole, not cordate, and, moreover, the fruiting calyx is equally 10-angled, not 5-angled as in *P. glutinosa*. To *P. Pringlei* the plant under consideration bears a strong superficial resemblance, but differs in having the leaves all entire, and in the character of the fruiting calyx.

Physalis Pringlei. Suffrutescent: stems 1 to 1.5 m. long, more or less branched, below terete, glabrous or nearly so, above and throughout the younger parts densely glandular-viscid: leaves single or in pairs, ovate to ovate-lanceolate, 3 to 8 cm. long, two-thirds as broad, more or less acuminate, acute, remotely sinuate-dentate or sublobate to subentire, narrowed at the more or less unequal base into a slightly winged petiole, glandular-viscid upon both surfaces: pedicels 1 to 1.5 cm. in length, at first erect or at least ascending, later reflexed: calyx during anthesis 7 to 9 mm. long; lobes ovate, attenuate, about equalling the tube: corolla about 2 cm. in diameter, repandly rotate, ciliate, conspicuously maculate

in 5 distinct areas with numerous dark purple spots, internally at the base densely pubescent; lobes obtusish: filaments about equal, glabrous; anthers purplish: calyx in fruit oblong-ovate, about 3 cm. long, definitely 5-angled, with intermediate ribs: berry about 1 cm. in diameter, glabrous. — Collected by C. G. Pringle on the Sierra de Clavellinas, State of Oaxaca, altitude 2,700 m., 18 October, 1894, no. 6001, distributed as "*P. foetens*, Poir."; also on the Sierra de Ajusco, Federal District, altitude 2,600 m., 2 October, 1895, no. 6216, distributed as "*P. glutinosa*, Schlecht." *P. Pringlei* is evidently allied to *P. foetens*, but is quite different in the much less dentate-lobed leaves, larger flowers, longer calyx, and in the marking of the corolla. From *P. glutinosa* on the other hand *P. Pringlei* differs in the leaves being contracted and attenuate at the base into a petiole, not cordate.

Lamourouxia Conzattii. Herbaceous, probably perennial; stems and branches dark red or purplish, minutely puberulent in decussating lines: leaves undivided, spreading or somewhat reflexed, 1–3-nerved, linear to linear-lanceolate, 1 to 2.5 cm. long, 1 to 4 mm. broad, acute, serrulate, slightly narrowed into a subpetiolate base, glabrous upon both surfaces, margins more or less revolute: inflorescence in terminal usually one-sided racemes; pedicels 0.5 to 1 cm. in length, minutely puberulent: flowers large, 5 to 6 cm. long, scarlet, dark red or reddish-yellow; calyx rather prominently 4-ribbed with intermediate less prominent ribs, puberulent to nearly glabrous, lobes more or less unequal, lanceolate, 4 to 9 mm. long, equalling or exceeding the tube, obtusish, entire: corolla externally pubescent, rather deeply bilabiate; tube below narrow, ampliated just above the base but not conspicuously ventricose; lower 3-lobed lip about 1.5 cm. long, only slightly spreading: perfect stamens 2, shorter than and included under the galea; anthers calcarate at the base, villous-pubescent; the posterior pair of stamens much shorter and bearing reduced villous anthers: style exceeding the anthers in length, pubescent; capsule ovate, narrowed above, glabrous. — Collected by V. González and C. Conzatti on the Cerro de Pápalo, camino de Cheve, Cuicatlan, Oaxaca, altitude 2,500 m., 16–22 June, 1898, no. 760, and by C. Conzatti on the Cerro de Yalina, District of Villa Alta, Oaxaca, altitude 1,500 m., June, 1899, no. 965. The author takes pleasure in dedicating this beautiful species to Señor Prof. C. Conzatti, whose energetic efforts have contributed much to our knowledge of the flora of Southern Mexico. As the species of this genus are treated in Am. Jour. Sci. l. 169, *L. Conzattii* would stand near *L. tenuifolia*, Mart. & Gal., but it is readily distinguished by the larger, longer, and more deeply colored flowers.

LAMOUROUXIA TENUIFOLIA, var. **micrantha.** Flowers only 1.8 to 2 cm. long: calyx cleft (in anthesis) nearly to the base: otherwise like the typical form. — Collected on the west side of Valley of Cuicatlan, Oaxaca, altitude 2,000 to 2,100 m., by E. W. Nelson, 10 November, 1894, no. 1891. Types in herb. Gray and herb. U. S. Nat. Museum.

VIBURNUM MICROCARPUM, Cham. & Schl., var. **evanescens.** Leaves conspicuously discolorous, green and, except for a few scattered stellate hairs on the sunken midrib, glabrous above, white and densely stellate-tomentose beneath: in all other characters corresponding well with the type specimen of the species. — Collected by C. G. Pringle in hedges and thickets at San Miguel del Soldado, Vera Cruz, altitude 1,850 m., 20 April, 1899, no. 8172.

GALIUM TRIFLORUM, Michx. Fl. i. 80. This species, hitherto doubtfully attributed to Mexico, may now be definitely incorporated in the Mexican flora. Specimens were collected by C. G. Pringle in swamps near Jalapa, altitude 1,200 m., 17 April, 1899, no. 8155.

VERNONIA SERRATULOIDES, HBK., Nov. Gen. & Sp. iv. 33, t. 316. Specimens collected by Dr. Edward Palmer in southwestern Chihuahua, August to November, 1885, no. 279, and described by Dr. Gray, Proc. Am. Acad. xxi. 393, as *Perezia paniculata*, prove upon careful examination to be a *Vernonia*, and moreover, correspond in all essential details with the original description and excellent illustration of *V. serratuloides*, HBK. Here also may be referred Goldman's no. 156, collected in the Sierra Madre, near Guasarachi on road from Parral to Batopilas, Chihuahua, altitude 2,000 to 2,100 m., 26 September, 1898.

Coreopsis rhyacophila. Suffrutescent: stems erect, terete, covered below with a thin grayish brown more or less deciduous cortex: leaves opposite, petiolate, 3 to 8 cm. long, nearly as broad, pinnately tri- or quadri-partite, glabrous upon both surfaces, glandular-punctate, divisions narrowly lanceolate, apiculate-acute; petioles 1.5 to 3 cm. long: heads 1 to 1.3 cm. high, and including the rays 2.5 to 3 cm. in diameter, few on long slender striate naked or 1–3-bracteate peduncles; involucral scales bi-seriate, the outer shorter, somewhat spreading, linear, acutish, the inner oblong-elliptic, 8 mm. long, half as broad, margins subscarious, glabrous except at the apex: rays yellow, longitudinally striate with brownish lines: achenes about 4 mm. long, the outer surface glabrous, the inner pubescent, margins conspicuously ciliate; pappus of two stoutish ciliated awns, equalling or slightly exceeding the achene. — Collected by C. G. Pringle in lava fields near Cuernavaca, Morelos, altitude 2,500 m., 9 February, 1899, no. 7866. In foliar characters *C. rhyaco-*

phila most closely resembles *C. petrophila*, Gray, but from this species it is readily distinguished by the inflorescence, and by the much larger heads. In the nature of the inflorescence *C. rhyacophila* is perhaps more nearly allied to *C. anthemoides*, DC., but from this species again our plant differs markedly in the coarser character of the leaves, and by the erect ligneous stem.

Spilanthes filipes. Herbaceous: stems erect, freely branching from the base, 3 to 4 dm. high, rather sparsely pubescent with jointed hairs: leaves opposite, petiolate, 3-nerved from near the base, ovate to oblong-lanceolate, including the petiole 2.5 to 6 cm. long, 0.8 to 2 cm. broad, obtusish, submucronate, crenate-dentate, narrowed rather abruptly or even attenuate at the base into a ciliated petiole, glabrous or with a few scattered hairs on the upper surface and on the midrib and lateral nerves beneath: heads radiate, 4 to 5 mm. high, nearly or quite as broad, borne on long slender (5 to 10 cm. long) peduncles which either terminate the stems and branches or spring from the upper axils; involucral scales oblong-ovate, 2 to 2.5 mm. long, slightly acuminate, acute, inconspicuously ciliate; ligules about 5, including the tubular portion 4 mm. in length; achenes of ray-flowers triangular: flowers of the disk 2.5 mm. long; achenes laterally compressed bearing two minute pappus-awns, ciliated, glabrous or nearly so on each face, at maturity about 1 mm. in length; pales rounded or subtruncate at the apex. — Collected by Dr. G. F. Gaumer in Yucatan, 1896, no. 1122. In general appearance *S. filipes* most resembles *S. ramosa*, Hemsl., but it differs materially by having much larger leaves, smaller heads, and stricter habit.

Dysodia Seleri, Robinson & Greenman, n. sp. Stoutish herb: branches terete, striate, puberulent, at length glabrate, glandless: leaves simple, opposite or sub-opposite, oblong, shortly acuminate, rounded or more often cordate at the sessile base, sharply and rather finely serrate, 6 to 13 cm. long, 2.4 to 4 cm. broad, dotted with numerous round pellucid glands; the uppermost leaves reduced, elliptical, often alternate: peduncles terminal, more or less clavate-thickened toward the summit: heads radiate, large, 3 cm. in diameter exclusive of the ligules: involucre puberulent, glandless; outer scales free, about 2-seriate, unequal, lanceolate, acute, herbaceous at least near the apex; inner scales united for two-thirds their length, their tips attenuate: rays 12 to 20, brown in a dried state, broadly elliptical, about 2 cm. long including the tapering tubular base; pales short, thickish, fimbriate: tubular flowers 2 cm. long including the sericeous-villous achenes: pappus 2-seriate, of about 20 subequal setose-fimbriate scales, 1 cm. in length: style-branches passing

abruptly into a slender acuminate appendage. — Collected by C. & E. Seler, near Xochicato, Cuernavaca, Mexico, December, 1887, no. 410, also near the Hacienda S. Gaspar in the same region, 18 December, 1887, no. 317. The affinity of this species appears to be with *D. grandiflora*, DC., *D. serratifolia*, DC., *D. integrifolia*, Gray, and *D. squammosa*, Gray. From all these it is readily distinguished by its glandless involucre with larger herbaceous outer scales. Type specimens are preserved in the Royal Botanical Museum, Berlin.

Lygodesmia ramosissima. Much branched from a perennial base; branches striate-angled, glabrous, somewhat junciform, not spinescent: leaves linear to subulate-linear, 0.5 to 7 cm. long, entire or remotely denticulate, occasionally with more conspicuously spreading teeth, glabrous: heads 5–6-flowered, terminating the ultimate branchlets on either short or elongated peduncles: involucre 2 to 2.3 cm. long, the outer calyculate bracts ciliate, the inner bordered by a hyaline margin and bearing near the apex a keel-like appendage: mature achenes subterete, smooth and glabrous, about 1.5 cm. long; pappus nearly or quite equalling the achenes, tawny. — *Lygodesmia juncea*, Gray, Pl. Wright. i. 129, not Don. — Collected by Charles Wright on the expedition from western Texas to El Paso, prairies of the Pecos River, August, 1849, no. 417; by C. G. Pringle on plains near the city of Chihuahua, Mexico, 18 August, 1885, no. 578 and by E. W. Nelson, between Ramos and Inde, Durango, 11 to 14 August, 1898, no. 4710. In habit *L. ramosissima* resembles most closely *L. juncea*, Don, but from this species it is readily distinguished by the size of the heads. From *L. aphylla*, DC., and its variety, our plant is at once separated by the copiously branched stems.

II. — SYNOPSES OF THE GENERA JAEGERIA AND RUSSELIA.

By B. L. Robinson.

The Genus Jaegeria.

The small helianthoid genus *Jaegeria*, inhabiting muddy shores and shallow pools of tropical America, is exceedingly well marked by its non-imbricated involucral bracts. These are similar to each other in form and are equal in number to the rays, in fact each stands just in front of

a ray and envelops the ray-achene by its thin infolded usually ciliate alar portions. The achenes are glabrous and crowned with a shallow callous cup, but otherwise pappusless.

Although thus clearly marked, the species of this genus have from habital similarities been much confused with those of *Sabazia*, *Galinsoga*, *Melampodium*, and *Spilanthes*. The following synopsis, drawn up during the study of the two new species here proposed, may therefore be found useful in showing the present status of the group.

* Heads axillary, pedunculate, racemose, relatively large (including the rays 1.6 to 2 cm. in diameter): rays about 12, conspicuous, pale yellow with more or less deep roseate tinge: scales of the involucre ciliolate, otherwise glabrous: weak aquatic essentially glabrous perennials.

+ Leaves slender-petioled.

1. **J. petiolaris.** *Sabazia glabra*, Wats. Proc. Am. Acad. xxiii. 277. — Shallow water, pine plains, base of the Sierra Madre, *Pringle*, no. 1295. The involute involucral scales enveloping the ray achenes clearly show this plant a *Jaegeria*. The transfer of Dr. Watson's name *glabra* to *Jaegeria* is rendered undesirable by the varietal use of this designation under *J. hirta* by Mr. Baker in the Flora Brasiliensis as mentioned below.

+ + Leaves sessile, amplexicaul.

2. **J. purpurascens.** Decumbent stem simple or sparingly branched, purplish, glabrous, leafy: leaves oblong-lanceolate, acute, sessile by a clasping base, entire, glabrous, 1.4 to 2 cm. long, 3 to 4 mm. wide: peduncles terete, purplish, 3 to 4.2 cm. long, puberulent near the summit, borne in the upper axils: disk 8 mm. in diameter, hemispherical, at length somewhat conical: rays 11 to 13, linear or narrowly oblong, purple, 6 mm. long: bracts of the open flattish involucre uniseriate, ovate, acute, strongly ciliate at the broadest involute part, green and glabrous dorsally: disk-flowers numerous; corollas pale yellow, 2 mm. long, glabrous except for a tomentulose ring at the base of the tube: achenes glabrous, 1.7 mm. long, crowned with a narrow callous ring otherwise calvous: ligules pale-yellow, shading to deep purple at the tip, 5 mm. long, 1.8 mm. broad. — Collected in shallow water near Durango, Mexico, by Dr. Edward Palmer, November, 1896, no. 805 (distributed as *Sabazia glabra*).

* * Heads solitary and axillary (*J. prorepens*) or more often terminal in the forks of the stem, or, when several, borne in leafy cymes: more or less pubescent plants of muddy shores or drier habitat: rays yellow or white.

+ Heads relatively large, including the well-exserted conspicuous yellow rays, 1.2 to 1.5 cm. broad.

++ Main stem prostrate, rooting at the nodes; branches ascending, few-headed: bracts foliar.

3. J. MACROCEPHALA, Less. Syn. Gen. Comp. 223, & Linnaea, ix. 270. — Jalapa, Mexico, *Schiede & Deppe*, *C. L. Smith*, nos. 1624, 1835; brook-sides near Patzcuaro, Michoacan, *Pringle*, no. 4166.

++ ++ Main stem erect from a short decumbent base: heads many: bracts reduced.

4. J. PEDUNCULATA, Hook. & Arn. Bot. Beech. 299. — Jalisco, *Beechey*, *Palmer*, no. 427, acc. to Gray, Proc. Am. Acad. xxii. 424; *Pringle*, no. 1772; also *Palmer*, no. 47 in part (*Spilanthes sessilis*, Gray, l. c. 428, not Hemsl.). The identity of Mr. Pringle's no. 1772 with the type specimen at Kew has been kindly verified by Mr. W. B. Hemsley.

+ + Heads considerably smaller; rays inconspicuous, scarcely exserted, yellow or white: pubescent or hirsute annuals.

++ Dwarf but not creeping, very slender; pubescence scanty: leaves small, ovate, not at all clasping at the base.

5. J. MNIOIDES, HBK. Nov. Gen. & Spec. iv. 278, t. 400. The only plant in herb. Gray corresponding at all satisfactorily to the plate and description of this Michoacan species is some rather poor material collected in Costa Rica by Oersted. In it the stems are very slender, simple or sub-simple, and erect, while the leaves are small and truly ovate, subsessile, but in no sense clasping. Kunth describes the rays as yellow. It is not unlikely that this original species of the genus was only a starved condition of the common *J. hirta*, Less.

++ ++ Tall, inclining to be repent at the base: leaves ovate, acutish: peduncles filiform, several times as long as the heads: pubescence usually copious and spreading.

6. J. HIRTA, Less. Syn. Gen. Comp. 223. *J. repens*, DC. Prodr. v. 544. *Acmella hirta*, Lag. Nov. Gen. & Spec. 31; Less. Linnaea, v. 153. *Melampodium brachyglossum*, J. D. Smith, Bot. Gaz. xiii. 74. *Spilanthes sessilifolia*, Coulter in J. Donnell Smith, Enum. Pl. Guat. i. 23, iii. 43. *Jaegeria calva*, Wats., a binomial needlessly published by Rusby, Mem. Torr. Club, iii. no. 3, 62.*

* Dr. Watson was quite right in regarding this plant as the characteristic *calvous* part of Schultz's mixed type of the unpublished *Galinsoga calva*, as the examination of Mandon's no. 80 (a portion of which has been kindly forwarded from the Kew Herbarium for comparison) clearly shows. Dr. Rusby's publication of another *Galinsoga calva*, founded on a pappus-bearing plant (which in the well known confusion of the Mandon numbers may or may not have had any relation to

This is evidently the commonest and most widely distributed species of the genus extending from western Mexico to Tropical Brazil. It is highly variable in stature, foliage, and degree of pubescence; yet floral or even vegetative characters for a satisfactory segregation appear to be lacking. Var. GLABRA, Baker, in Mart. Fl. Bras. vi. pt. 3, 167, is, to judge from its first mentioned type (Mandon's no. 80), merely a smoother not an altogether glabrous form as its description would imply.

+ + + Dwarf, not creeping, freely branched, smoothish: leaves, at least the upper ones, obovate or oblong, sessile by a narrowed but still somewhat clasping base: peduncles short or none.

7. J. DISCOIDEA, Klatt, Arbeit. des Hamb. Botan. Mus. 1893, p. 2 of reprint. Heads small (not discoid even in Klatt's type specimen!), short-peduncled or sessile: rays small although slightly exserted, white or pale yellow. — *Pringle*, no. 4279 from the Sierra de las Cruces, State of Mexico (type), also *Pringle*, no. 7349, *Bourgeau*, no. 1232, and *Schaffner*, no. 286, all collected in or near the Valley of Mexico. Perhaps too near *J. hirta*. Klatt's ill-chosen name must be retained with regret.

+ + + + Low, creeping: leaves rounded at the base: Galapagos Islands.

8. J. PROREPENS, Hook. f. Trans. Linn. Soc. xx. 214. — James Island, *Darwin*.

Schultz's type) appears to me a mistaken fidelity to an indefinite and inappropriate specific name, especially when Dr. Rusby explains so carefully that he himself and not Schultz should stand as authority for the pappus-bearing *G. calva*. *Jaegeria calva*, as applied by Dr. Watson, was merely an herbarium name, resting upon an obvious clerical error. Far from being "astonishing," slips of this sort appear to be tolerably frequent in manuscript work of even the most careful botanists. The thoughtless publication of such mistaken names, however, merely adds to the mass of an already burdensome synonymy. It may be worth while to note in passing that Dr. Rusby's name *G. calva* is not only inappropriate and misleading, but that according to the Rochester Code it has no right to stand. *G. calva*, Sch. Bip., is not, as Dr. Rusby maintains, a *nomen nudum*. It is clearly given (as Dr. Rusby admits) by Baker in the Fl. Bras. vi. pt. 3, 167 (1884) in the synonymy of *Jaegeria hirta*, var. *glabra*. Its status is thereby established, and it is impossible to deny its publication, since it has been used in print together with a description, defining synonymy, and the citation of Mandon's no. 80, one of the types originally mentioned by Schultz. But as thus defined it was applied to a *Jaegeria*. Whether we write *Galinsoga calva*, Sch. Bip., or *G. calva*, Baker, in our synonymy of *Jaegeria hirta*, the combination *Galinsoga calva* has been a published binomial since 1884, and Dr. Rusby's *G. calva*, applied to a different plant, is thus a later homonym which a rational application of the Rochester rules would discard. It is to be hoped that if any one feels impelled, on account of the "doctrine of homonyms," to assign a new name to Dr. Rusby's species, the choice may be more felicitous.

* * * Heads small, discoid: branched pubescent annual: Galapagos Islands.

9. J. GRACILIS, Hook. f. l. c. 213. — Charles Island, *Darwin.*

Doubtful species.

J. BELLIDIOIDES, Spreng. Syst. iii. 591, of Uruguay, is unrecognized and probably, like nearly all of the other species referred by Sprengel to *Jaegeria,* belongs to some other genus.

THE GENUS RUSSELIA.

Considerable recently acquired material of *Russelia* seems to show Bentham's extreme reduction of the species ill-advised. At least a dozen may be recognized with advantage. The following provisional key may prove of assistance in identifying the members of this confused genus.

* Stems and branches sharply 4-angled, the angles bearing ciliated wings: peduncles opposite, axillary, solitary. S. America.

1. R. ALATA, Cham. & Schlecht. Linnaea, iii. 3 (1828); Schmidt in Mart. Fl. Bras. viii. pt. 1, 269, t. 44, f. II. — Tropical Brazil, *Sellow & Riedel.*

* * Stems and branches sharply angled not winged; the angles prominent, often thickened; the intervening areas flat or concave.

← Juncoid, excessively branched: peduncles filiform, 1–2 (–3)-flowered, much exceeding the subtending bracts.

2. R. EQUISETIFORMIS, Schlecht. & Cham. Linnaea, vi. 377 (1831). *R. juncea*, Zucc. Flora, 1832, II. Beibl. 99 (1832), is only a large flowered form of this species. The type of *R. equisetiformis* has been examined by Mr. J. M. Greenman in Berlin and proves to have corollas which vary from 1 to 2 cm. in length, thus invalidating the chief distinction between the species, a fact also noted by Dr. Loesener, Bull. Boiss. ii. 562.

← ← Peduncles short, the primary ones never equalling the subtending leaf-like bracts, usually several–many-flowered.

→→ Leaves entire, subcoriaceous, lucid.

3. R. SUBCORIACEA, Robinson & Seaton, Proc. Am. Acad. xxviii. 113. — Tamasopo Cañon, San Luis Potosi, Mexico, *Pringle*, no. 5086.

→→ Leaves serrate: calyx-lobes oblong-lanceolate, gradually attenuate, not at all subulate at the tip: flowers 2 to 2.4 cm. in length.

4. **R. jaliscensis.** Copiously branched: stems and branches sharply

quadrangular, glabrous : leaves opposite, thin, ovate to ovate-lanceolate, acute, attenuate at the base, covered on both surfaces with a sparse more or less deciduous pubescence and resinous(?) punctation, ciliolate at least when young, sharply serrate ; petioles 2 mm. long ; blade about 2 cm. long, half as broad : floriferous branches leafy-bracted ; bracts somewhat obovate, cuneate at the base ; peduncles 2-flowered ; pedicels slender, 4 mm. in length : calyx herbaceous, 6 mm. long, divided nearly to the base ; segments oblong-lanceolate, gradually and evenly narrowed almost from the base to the flat acute but not at all subulate tip : corolla scarlet, 2.4 cm. long, externally glabrous, internally pubescent near the base and bearded along a ventral line ; lobes orbicular, spreading : capsule ovate, stramineous, 6 mm. long. — *R. sarmentosa*, Gray in Wats. Proc. Am. Acad. xxi. 434, not Jacq. — Collected in Jalisco in barrancas near Guadalajara by Dr. Edward Palmer, June, 1886, no. 126, and by C. G. Pringle, June, 1889, no. 2568. Types in herb. Gray. This species differs from any other known to the author in the shape of its calyx-lobes.

++ ++ ++ Leaves serrate : calyx-lobes broadly ovate, acuminate to subulate tips.

= Stems and branches chiefly 4-angled, glabrous or glabrate.

a. Leaves not cordate.

5. R. SARMENTOSA, Jacq. Enum. Pl. Carib. 25 (1762) nomen, Stirp. Select. Am. 178 (1763), t. 113.

b. Leaves cordate.

6. R. FLORIBUNDA, HBK. Nov. Gen. & Spec. ii. 359 (1817). Doubtless represented by Palmer's no. 252 from near Acapulco.

7. R. SYRINGAEFOLIA, Cham. & Schlecht. Linnaea, vi. 376 (1831).

= = Stems and branches 6–many-angled.

a. Stems glabrous or soon glabrate.

8. R. VERTICILLATA, HBK. Nov. Gen. & Spec. ii. 360 (1817).

b. Stems tomentulose or pubescent.

1. Leaves small.

9. R. POLYEDRA, Zucc. Abh. Akad. Muench. ii. 328 (1832-36). *R. retrorsa*, Greene, Pittonia, i. 176, is hardly distinct.

2. Leaves large.

10. R. TERNIFOLIA, HBK. Nov. Gen. & Spec. ii. 359 (1817).

* * * Stems sub-terete, merely striate-angulate.

+ Branches of the inflorescence pseudo-racemose, elongated, loosely flowered: leaves large, thickish, veiny, tomentulose beneath.

11. R. ROTUNDIFOLIA, Cav. Icon. v. 9 (1799), t. 415. — Near Acapulco, Mexico. Dr. Palmer's no. 509 must be of this species.

+ + Branches of the glomerate inflorescence cymose, many-flowered: leaves thin, acute or acutish: stem glabrous.

12. R. MULTIFLORA, Sims, Bot. Mag. t. 1528 (1813). — *R. paniculata*, Mart. & Gal. Bull. Acad. Brux. xii. pt. 2. 19 (1845), appears to be merely a verticillate-leaved form of this species.

+ + + Inflorescences cymose, very short, opposite on prolonged branches: flowers very small: leaves bullate, obtuse: stem pubescent.

13. R. tepicensis. Probably suffruticose; stems subterete, striate-angulate with many fine ribs, subappressed-pubescent, internodes considerably exceeding the ternate broadly ovate cordate petiolate obtuse crenate-dentate leaves; these membranaceous, glabrous and with impressed veins, strigillose on the veins and resinous-punctate on the surface beneath, 3 cm. long, 2.4 cm. broad; petioles 3 mm. long, appressed-pubescent: floriferous branches (1 to 1.5 dm. long) mostly verticillate toward the ends of the stems: bracts ovate, petiolate, crenulate, small but exceeding the short peduncles (2 to 3 mm. in length); pedicels and subulate bractlets pubescent: calyx-lobes ovate, acuminate to slender recurved tips, puberulent near the middle, thin at the margin, 2 mm. long: corolla 6 to 7 mm. long, bearded near the base within, externally glabrous; lobes spreading: capsule ovoid, nearly spherical, glabrous, lucid, small, 3 to 4 mm. in length, slightly grooved between the carpels; these slightly carinate dorsally. — Collected at Zopelote, Tepic, Mexico, February, 1895, altitude 600 to 900 m., by Frank H. Lamb, no. 578. Type in herb. Gray. This species is distinguished from *R. sarmentosa*, Jacq., by its subterete pubescent stems, ternate subcordate leaves, and very small flowers. *R. rotundifolia*, Cav. and *R. multiflora*, Sims, the only other species with subterete stems known to the writer, have much larger inflorescences and also differ in the form and pubescence of the leaves.

III.—NEW DIOSCOREAS FROM MEXICO.

By E. B. Uline.

Dioscorea pumicicola. Only ♂ plant seen. Stem slender, gl brous, dextrorsely twisted; leaves cordate at base, deltoid or sub-trilobat lateral lobes rounded, median part ovate and blunt or abruptly acumina at apex, about 7-nerved, glabrous above, sparsely pubescent on tl nerves beneath; flowers arranged in 3–5-flowered cymules, which a short-pedunculate, and situated at the angles of the slender rhachi anthers subsessile, triangularly disposed at the centre of the open cai panulate greenish-brown corolla.

Leaves 8 to 12 cm. broad, little longer than wide. Petiole 4 or 5 c long, puberulent. Rhachis slender, angulate-flexuous, puberulent, 1 to 1 dm. long. Cymules 4 to 8 mm. apart, subsessile or on short pedunel Flowers sessile, 3 mm. wide, with orbicular corolla-lobes, the inn whorl shorter. Anthers very minute.—This species is intimately r lated to *D. macrostachya* and *D. spiculiflora*, its inflorescence and flowe being essentially the same as the latter, but it differs radically from bo in its lobed leaves and pubescence.

Morelos, lava beds near Cuernavaca; C. G. Pringle no. 7227 ♂, 189

D. oaxacensis, Uline in Engl. & Prantl, Nat. Pflanzenf. Nachtr. II, 5, p. 86, without characterization. — Glabrous, glaucous; leav chartaceous, cordiform with wide sinus, 9-nerved, exterior nervés (both sides more or less forked; ♂ racemes elongate, simple; rhachis angulate; flowers shortly pedicellate, in 2–3-flowered rather remote fa cicles (rarely solitary), segments of the subrotate 6-parted perian oblong, rather acute, the interior ones slightly narrower; fertile stame 3, subcentral, a little shorter than the segments of the corolla, *strong incurved*, anthers extrorse in the bud, sterile filaments 3, very short, fl entire, sometimes bearing effete anthers.

Stem compressed, angular, sinistrorsely twisted. Leaves scattered 2 to 4 cm. wide. acuminate. Petioles about 2 cm. long. Racemes as lo as 1.5 dm. Floral fascicles 4 to 12 mm. distant, shortly pedunculat Flowers 6 mm. wide, on short slender pedicels; corolla-segments thi membranaceous, unequal, greenish-yellow.

Syn. *D. macrostachya*, Mart. & Gal. Bull. Acad. Brux. ix. pt. 2, 391 (1842), not Benth.

Mexico near Reyes, altitude 1,800 to 2,050 m., E. W. Nelson, r 1786, in part, i. e., as to ♂ plant, in 1894. The only other specim

of this plant known to be in existence was collected by Galeotti (no. 5456 ♂) and is in the herbarium at Brussels.

D. LOBATA, Uline, var. **morelosana.** Middle lobe of leaf obtuse, mucronate; larger leaves measuring 2.5 dm. long and wide; flowers with deeper tube; pedicels shorter and nearer together than in the species.

Morelos, lava beds near Cuernavaca, altitude 1,540 m., C. G. Pringle, no. 7341 ♂.

IV.—NEW PHANEROGAMS, CHIEFLY GAMOPETALAE, FROM MEXICO AND CENTRAL AMERICA.

By B. L. ROBINSON.

Hechtia sphaeroblasta. Only ♂ plant known: leaves 7 dm. long, 4.5 cm. broad at the base, gradually attenuate to a slender pungent apex, gray and scurfy on the lower (in dried state concave) surface, pale green but nearly smooth upon the reverse face, armed on the margins at intervals of about 2 cm. with very sharp incurved stramineous spines (2 mm. in length): inflorescence many-branched; axes smooth and glabrous, at least 7 dm. high; bracts ovate-oblong, acute, entire, 1 cm. or more long, scarious, with many fine dark veins; branches 1 to 3 dm. long, angled, ascending, glabrous, 5–9-branched near the middle, bracts of the second order, small, scarious, about 2 mm. long; branchlets 4 to 12 cm. long, slender, ascending, loosely floriferous from the base to the tip, their bractlets scarious, 1 mm. long; buds broadly ovoid almost globose, 3 mm. long just before expanding: flowers 14 to 30 on each branchlet, borne singly or subverticillate, nearly sessile, 6 mm. broad in anthesis: calyx-divisions oval, 2 mm. long; petals (in dried state yellowish white) suborbicular, distinct or nearly so, 3 mm. long, obtuse: rudimentary ovary in ♂ flowers glabrous. — Collected by E. W. Nelson at Tlapa, Guerrero, Mexico, altitude 1,200 m., 3 December, 1894, no. 2044. Types in herb. Gray and herb. U. S. Nat. Museum. This species possessing subsessile flowers, elongated flowering branchlets, and glabrous ovary, evidently belongs in the group with *H. rosea*, Morr. (which has much larger flowers), *H. stenopetala*, Kl. (which has a much denser inflorescence and acuter petals), and *H. gamopetala*, Mez (which has the petals united).

SMILAX DOMINGENSIS, Willd., var. **microscola.** Stem rather thickly

and branches sparingly covered with very short straight conical spines (0.5 mm. in length): otherwise corresponding closely to the typical West Indian plant. — Collected by E. W. Nelson between Tumbala and El Salto, Chiapas, Mexico, altitude 466 to 1,400 m., 29 October, 1895, no. 3392. Types in herb. Gray and herb. U. S. Nat. Museum.

Polygonum Meisnerianum, Cham. & Schlecht., var. **jalapense**. Stems, ochreae, leaf-margins, and bracts covered with numerous stalked glands; prickles (developed in the typical form) obsolete: leaves inclining to hastate lobing at the base. — This is probably the *P. Meisnerianum* of Cham. & Schlecht. in Linnaea, v. 90, but much more glandular than the typical form, characterized in Linnaea, iii. 40. — Collected by C. G. Pringle in wet places near Jalapa, Mexico, altitude 1,225 m., 5 April, 1899, no. 8111. This species appears to have been overlooked by Mr. Hemsley, as it is not recorded in the Biologia Centrali-Americana.

Telanthera mollis. Branches lignescent, terete becoming subquadrangular near the slightly tumid nodes, covered when young with a soft short spreading or even reflexed pubescence, at length quite glabrate: leaves lance-oblong, entire, acute at each end, finely appressed-pubescent and (in the dried state) rugulose above, much paler and sericeous-tomentose beneath, 4 to 6 or more cm. long, about half as broad; pubescent petioles about 1 cm. long: heads oval, obtuse, leafless, 1.4 to 2.2 cm. long, 1.4 cm. in diameter, borne in 2–4-chotomous spreading round-topped panicles; ultimate tomentose pedicels 1 to 1.5 cm. long; bracts ovate, acute: sepals oblong, acute and pungent, subequal, 7 mm. long, dorsally covered with long dense silky hair: staminеal tube a little shorter than the ovary, the sterile segments 2.3 mm. long, fimbriated above, about equalling the filaments and somewhat surpassed by the anthers: style nearly as long as the ovary; stigma globose, unlobed. — Collected in Oaxaca in a cañon above Totolapam by C. & E. Seler, 3 January, 1896, no. 1637. Near *T. pubiflora*, Moq. and (ex char.) *T. pycnantha*, Moq. Differing from the former in its rounded many-headed panicles and from both in its larger strongly villous flowers. Type in herb. Gray.

Mimosa Deamii. Arborescent, 3 m. high: branches terete, unarmed, fuscous, tomentulose and roughened by the enlarged persistent bases of strigose hairs; stipules short, thickish, subulate, strigose: petioles 1.5 to 2.7 cm. long: pinnae a single pair; their rhachises about 5 cm. long, each bearing 5 to 6 pairs of leaflets, strigose; leaflets elliptical, rounded at each end, coriaceous, glabrous above, sparingly strigose (chiefly on the excentric midnerve) beneath, 2.3 to 3.6 cm. long, half as broad, 3–4-

nerved, strigose-ciliate: flowers roseate, in globose heads; peduncles 2.5 cm. long, borne by 2's or 3's at the nodes of unbranched terminal racemes: heads (including exserted stamens) 1.6 cm. in diameter: bractlets small, spatulate or oblanceolate, with thickened pubescent acute ends: calyx translucent, closely appressed, scarcely toothed but strongly ciliate: corolla 4-lobed, 4-nerved, 2.7 mm. long, the lobes oblong, subcarinate, tomentulose toward the summit, about half the length of the tube: stamens 4; filaments 3 times as long as the corolla, slightly enlarged above: fruit green, 3–4-jointed, constricted between the oval moderately flattened strigose segments, stipitate, 3 to 3.4 cm. long, 8 mm. broad. — Collected at Salina Cruz, State of Oaxaca, Mexico, by Charles C. Deam, 21 December, 1898, no. 113.

This species (of § Eumimosa) is most nearly related to *M. psilocarpa*, Robinson, but is readily distinguished by its strigose fruit and narrow strigose not soft-pubescent leaflets.

M. psilocarpa. Branches ligneous, terete, unarmed, roughened by ferrugineous lenticels: petioles 2.3 to 5.4 cm. long; leaves 1-jugate; leaflets on each division normally 3 pairs (the inner member of the lowest pair often reduced), obovate, oblique or semicordate at the base, firm and subcoriaceous, 2.8 to 3.6 cm. long, 1.5 to 2.5 cm. broad, when young finely pubescent upon both surfaces, in age pale, lead-colored (in dried specimens), slightly lucid, glabrate except for a few short appressed or incurved stramineous bristles upon the slightly thickened margin and upon the nerves beneath: peduncles about 3 cm. long, divergent, borne singly or by twos at the nodes of short terminal racemes; bracts subulate, ciliate; flowers perfect (so far as observed), capitate: calyx 0.7 mm. long, slightly toothed, ciliolate: corolla 4-toothed, 4 mm. long, 4-nerved; the teeth lanceolate, one-third the length of the tube: stamens 4: ovary slender-stiped; pod 2–4-jointed, glabrous, wholly unarmed, 2 to 3 cm. long exclusive of the stipe (nearly half as long), 1.3 cm. broad, constricted between the segments, mucronate. — Mountain woods between "S. Carl and S. Bartolo Yuahntepec," Oaxaca, collected by C. & E. Seler, 6 January, 1896, no. 1727. This species belongs to Bentham's series *Castae* and may be placed near *M. lactiflua*, Delile, although in habit and large leaflets it suggests some of the *Sensitivae*.

Cuphea Reipublicae, Rob. & Sea. Proc. Am. Acad. xxviii. 106. The type number of this species, unfortunately cited at the time of publication as Pringle's no. 4112, is his no. 4142.

Vernonia liatroides, DC. Prodr. v. 34 (1836). Add syn. *Eupatorium tulanum*, Klatt, Abh. Naturf. Ges. Halle, xv. 323 (1882).

Stevia arachnoidea. Stem, branches of inflorescence, &c., at first white-lanate, soon arachnoid, and at length merely glandular-puberulent: leaves opposite, lance-oblong, acute, cuneate at the base to a very short petiole, pinnately veined, 8 cm. or more in length, dentate, puberulent above, much paler and tomentose beneath: inflorescence a round-topped dense compound corymb, its branches mostly alternate, spreading at a considerable angle and often exceeded by the long narrow linear subtending bracts; heads slender, crowded; involucral bracts puberulent, acute, 6 mm. long: corollas pubescent, 5 mm. long, the tube purplish, the limb white or at least pale: achenes black, glabrous: pappus of several short unequal acute scales, without long awns. — *S. compacta*, Coult. in J. D. Smith, Enum, Pl. Guat. ii. 33, not Benth. — Collected by Mr. J. Donnell Smith on the Volcano of Agua, Department Zacatepequez, altitude 2,700 m., April, 1890, no. 2327. Type in herb. Gray. *S. compacta*, Benth. Pl. Hartw. 197, must from description have been a very different plant with ovate leaves a third to half as long and involucres also much smaller. Schultz Bipontinus (Linnaea, xxv. 279) regarded Bentham's species as probably a form of *S. rhombifolia*, HBK.

S. Aschenborniana, Sch. Bip. Linnaea, xxv. 269 (1852). Mr. J. M. Greenman informs me that his *S. diffusa*, Proc. Am. Acad. xxxii. 307 (1897), proves on comparison with authentic material at the Royal Botanical Museum in Berlin to be identical with *S. Aschenborniana*.

S. bicrenata, Klatt, Engl. Jahrb. viii. 32, was founded upon a poorly developed specimen of *S. elatior*, HBK.

S. elatior, HBK., var. *decumbens*, Rob. & Greenman, Am. Jour. Sci. l. 152., later published as *S. decumbens*, Greene, Pittonia, iii. 32, is *S. Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xx. 75.

S. madrensis, Gray, Proc. Am. Acad. xxi. 382, should, I believe, be reduced to *S. Plummerae*, Gray. There seem to be no differences of moment.

S. monardaefolia, HBK., var. **amblyolepis.** Leaves large and very thin, the blade somewhat deltoid-lanceolate or ovate, rather abruptly contracted at the base: scales of the involucre obtuse or rounded at the apex. — Collected by E. A. Goldman, at Pinal, Chihuahua, Mexico, altitude about 1,800 m., 19 September, 1898, no. 116.

S. monardaefolia, HBK., var. **macrophylla.** Leaves rhombic-ovate, 1.2 dm. long, 5 to 6 cm. broad, cuneately decurrent upon the petioles 3 cm. or more in length: involucral bracts acute. — Collected by C. G. Pringle, woods of Eslava, Valley of Mexico, Federal District,

altitude 2,350 m., 28 January, 1899, no. 8057, and earlier in woods at base of mountains in the Valley of Mexico, Federal District, 6 November, 1896, no. 7328.

S. neurophylla, ROBINSON & GREENMAN, n. sp. Erect strict slender somewhat rigid herb, 3 to 6 dm. high: stem terete, puberulent, simple or sparingly branched: leaves strictly opposite, thick, rigid, appressed, linear-oblong, longitudinally ribbed with many close parallel nerves, 2 to 5 cm. long, 3 to 5 mm. broad, sessile by a subclasping base, concolorous, green and nearly glabrous upon each surface; the lowest shorter, the upper also much reduced and distant: heads capitately aggregated at the summit of the stem; bracts of the involucre rather rigid, glandular-puberulent, acute, 5 to 7 mm. long: corolla white, nearly glabrous: achene dark nearly black, hispid both between and upon the lighter colored angles; pappus of 4 to 6 long almost plumose awns and as many oblong intermediate scales. — Collected by E. W. Nelson between Ayusinapa and Petatlan, Guerrero, Mexico, altitude 1,500 to 2,100 m., 14 December, 1894, no. 2133. Types in herb. Gray and herb. U. S. Nat. Museum.

S. Rosei. Herbaceous smoothish perennial herb with tough dark fibrous roots: stems single, erect or slightly decumbent, 3 to 5 dm. high, usually branched from the middle, puberulent (under a lens) with crisped white hairs or quite glabrate; branches opposite, ascending: leaves opposite, sessile, oblong or lance-oblong, subcoriaceous, veiny, crenate-serrate or nearly entire, usually obtuse, with 3 to 5 more or less anastomosing nerves: heads in several small dense somewhat leafy-involucrate capitate corymbs, these together forming a very loose leafy corymb; involucral bracts green, linear, attenuate, very acute, 8 to 10 mm. long, almost glabrous, not much surpassed by the white or pale purplish corollas: achenes black, glabrous; pappus of 3 or more oblong obtuse scales with or without 2 or 3 naked awns. — Collected by Dr. J. N. Rose on the Sierra Madre, west of Balaños, Jalisco, 15 to 17 September, 1897, no. 2994; also in the state of Durango, 13 August, 1897, no. 2258. This species is evidently related to *S. Pringlei*, but differs in its short-pedicelled glomerate heads, larger leaves, etc. It is also related to *S. venosa*, Gray, and *S. Plummerae*, Gray, but differs from both in inflorescence and character of its involucral bracts.

S. Seleriana. Stems stoutish, lignescent, terete, white-lanate upon the younger internodes, soon arachnoid, glabrate, and at length verrucose with prominulous lenticels: leaves all opposite, decussate, petiolate, oblong, crenate at the sides, subentire at the acutish apex, entire at the

cuneate base, thickish, glabrous and covered on both surfaces (under a lens) with very numerous dark glandular dots; blade 8 to 10 cm. long, 2.3 to 3 cm. broad, pinnate-veined, the midnerve prominent beneath, grooved above; petiole 1.8 cm. long; the upper axils proliferous: inflorescence relatively small, 4 cm. broad, a trichotomous short-peduncled corymb; involucral bracts 5 to 6 mm. long, viscid-pubescent upon the back, acutish: flowers 5; corolla, apparently white, about twice the length of the involucre, the tube viscid-puberulent: achenes smooth or nearly so, crowned with several narrow acute or subulate scales; more elongated awns apparently lacking. — Collected by C. & E. Seler in mountain woods between St. Carlos and St. Bartolo, Yantepec, Oaxaca, Mexico, 6 January, 1896, no. 1695. Well marked. Types in herb. Gray and herb. Royal Botanical Museum, Berlin.

S. SERRATA, Cav., var. **arguta.** Leaves narrowly linear, ascending or appressed, sharply serrate with incurved teeth: scales of the involucre attenuate to a dark subulate tip. — Collected by C. G. Pringle on the Cerro Ventoso above Pachuca, altitude 2,900 m., 18 August, 1898, no. 7652.

S. tephra. Ashy throughout with a close pulverulent pubescence not glandular: stems herbaceous, terete, purplish: leaves scattered, elliptical, obtuse, crenate-serrate, 3 cm. long, half as broad, 3-nerved, finely pubescent upon both surfaces, slightly paler beneath, mostly conduplicate along the midrib, gradually narrowed to a petiole (1 cm. in length); fascicles of smaller leaves on short or scarcely developed axillary shoots: inflorescence a moderately dense compound corymb; its branches chiefly alternate, ascending, the lower and longer about 8 cm. in length, the heads densely clustered at their summits; individual pedicels 1 to 2 mm. long; involucral scales merely acutish, cinereous-puberulent, without evident glands, green or purplish-tinged, 4 to 5 mm. long: flowers 5, about twice the length of the involucre: corolla-tube purplish, puberulent; limb white or nearly so: achenes black, lucid, 4 mm. long, minutely roughened upon the angles; pappus of three awns (equalling the corolla) and 3 short blunt intermediate scales. — Collected by C. G. Pringle, Sierra de Pachuca, Hidalgo, altitude 2,925 m., 13 September, 1899, no. 8229.

Piptothrix Goldmanii. Glabrous: stems terete, striate, purple, slightly lucid; internodes 6 to 8 cm. long: branches opposite: leaves deltoid-ovate, acuminate, serrate, 3-nerved from the shortly cuneate base, green and glabrous upon both surfaces, 8 to 10 cm. long, 6 to 8 cm. broad, thin but firm in texture, reticulated veins slightly prominent upon

the scarcely paler under surface; petioles slender, 1.5 cm. long, purple: heads small, crowded in round-topped corymbs at the ends of the branches; pedicels and bracts filiform; scales of the involucre linear, substriate, 2.5 mm. long, slightly ciliated near the acute tip: corollas white, 3 mm. long, enlarged at the base of the tube, glabrous: achene scarcely over 1 mm. long, black, glabrous; pappus-bristles 5 to 8, often 5 one over each angle of the achene, unequal, white, caducous. — Collected by E. A. Goldman near Batopilas, Chihuahua, Mexico, altitude 1,700 to 1,750 m., 4–5 October, 1898, no. 196. Readily distinguished from the other species of the genus by its much broader and well-petioled leaves. This may possibly prove identical with *Eupatorium triangulatum*, Alam., or *E. rubrocaule*, HBK.

An effort to secure a more accurate classification of the tropical American Eupatoriums represented in the Gray Herbarium has suggested the publication of the following new species and specific reductions. The writer hopes later to publish a synopsis of the Mexican and Central American species and thereby show more clearly the affinities of the forms here proposed.

EUPATORIUM ADENACHAENIUM, Sch. Bip. in Klatt, Leopoldina, xx. 75 (1884). Add syn. *E. adenochaetum*, Hemsl. Biol. Cent.-Am. Bot. ii. 91 (1881), nomen nudum.

E. ADSPERSUM, Klatt, Bull. Soc. Bot. Belg. xxxv. 279. Add syn. *E. polanthum*, Klatt, l. c. 281. It is impossible to detect differences of any moment whatever. I doubt whether either is really distinct from Dr. Klatt's earlier species *E. anisochromum*, Bull. Soc. Bot. Belg. xxxi. 186 (1892).

E. aegirophyllum. Stem terete, clothed with close sordid or tawny slightly scabrous tomentum; internodes long: leaves opposite, ovate, subrotund, shortly acuminate, shallowly and broadly cordate, 1.2 dm. long, nearly or quite as broad, puberulent and slightly scabrous above, much paler and at first tomentose but at length glabrate and veiny beneath, serrulate (sometimes obsoletely so); nerves at base pinnate then palmate somewhat above the base; petioles tomentose, 5 to 7 cm. long: inflorescence a large round-topped many-headed panicle; branches opposite, tomentose; primary bracts petiolate, similar to the leaves; the secondary and ultimate ones linear or subulate; heads 1 cm. long, 20–30-flowered; involucral scales about 22, lance-linear, subequal, acute, glandular-puberulent on the back, loosely imbricated: corollas 5 mm. long, about equalling the whitish pappus; the slender proper tube ex-

ceeding the gradually ampliated throat: achenes slender, brown, attenuate below, 3 mm. long. — Collected by E. W. Nelson on eastern slope of Mt. Orizaba, altitude 1,500 to 2,100 m., 21 March, 1894, no. 304. Near *E. subpenninervium*, Klatt, but with smaller more numerous heads, and with petioles 2 to 3 times as long, etc.

E. ALBICAULE, Sch. Bip. in Klatt, Leopoldina, xx. 89 (1884). Add syn. *E. drepanophyllum*, Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 356 (1894). The type of the latter species stated by Dr. Klatt as collected by *Sauwne* is *Gaumer's* no. 122 from Cozumel Isl.

E. ALBICAULE, Sch. Bip., var. **laxius.** Inflorescence somewhat looser than in the type: scales of the involucre linear-attenuate, 5 mm. long. — Collected by Dr. Edward Palmer in Ymala, Mexico, 16 to 25 August, 1891, no. 1474 (type) and by Dr. J. N. Rose at Rosario, Sinaloa, 7 July, 1897, no. 1566. Dr. Rose's no. 1839 from the same locality is probably the same, although the inflorescence is still more open.

E. amblyolepis. Smoothish herb or undershrub, 3 to 6 dm. high; stems slender, terete, at first puberulent, soon glabrate and lucid, copiously branched; branches opposite, ascending: leaves opposite, lanceolate, acute to attenuate at each end, serrulate to subentire, thin, green, glabrous, and somewhat lucid, minutely pellucid-punctate, 5.5 cm. long, 1.3 cm. broad, 3-nerved from somewhat above the cuneate base; petioles 4 to 6 mm. long: heads small, numerous, in flat-topped corymbs; pedicels 5 to 8 mm. long, bracteolate near the summit; involucral bracts about 13, in 2 subequal series, obovate-oblong, pale green, striate, rounded and ciliolate at the summit, 3 mm. long, at length spreading: flowers about 15, small: corolla probably white, 3.5 mm. long, somewhat exceeding the very delicate and rather sparse bright white pappus: achenes 1.5 mm. long, black, minutely roughened on the sharp angles. — Collected by C. G. Pringle on cool ledges of the Sierra de Tepoxtlan, 24 km. northeast of Cuernavaca, altitude 2,300 m., 7 February, 1899, no. 8034.

E. AREOLARE, DC., var. **leiocarpum.** Nearly glabrous throughout: flowers somewhat larger than in the typical form and borne in condensed cymes: achenes smooth. — Collected by E. W. Nelson, near Chilpancingo, Guerrero, Mexico, altitude 2,700 to 3,100 m., 24 December, 1894, no. 2221. Types in herb. Gray and herb. U. S. Nat. Museum. There are no marked differences between the typical form of this species and the later *E. tubiflorum*, Benth. Pl. Hartw. 76, so far as the tolerably detailed descriptions indicate. Hemsley refers to Ghiesbreght's no. 530 under both names. The vaguely characterized *E. papantlense* of Lessing may perhaps be the same.

E. BADIUM, Klatt, Bull. Soc. Bot. Belg. xxxi. 186 (1892), a species based upon a Costa Rican type, is well matched by Mr. E. W. Nelson's no. 2251 collected near Chilpancingo, Guerrero, Mexico.

E. BERTHOLDII, Sch. Bip., var. **stenophyllum.** Leaves lance-oblong, attenuate at each end, 9 cm. long, 2 to 2.4 cm. broad, entire. — Collected by C. G. Pringle in cañons near Guadalajara, Jalisco, 8 December, 1888, no. 1831. A shrub 2 m. high. The typical form of northwestern Mexico has ovate serrulate leaves.

E. brickelloides, Klatt, Jahrb. Hamb. Wissensch. Anstalten, ix., pt. 2, 1892, 124, is a *Trixis!*

E. capnoresbium. Shrub with slender opposite terete glabrate branches; branchlets, petioles, and pedicels sordid glandular-tomentose: leaves opposite, elliptic-oblong, acute at each end, impunctate, more or less serrate from the middle to the apex, not revolute at the base, pubescent above with short rather sparse hairs, paler and pubescent especially on the midnerve and pinnate veins beneath, 3.5 cm. long, 1.6 cm. broad; petiole 6 mm. long: heads (1 cm. in length) in trichotomous round-topped fastigiate corymbs, slender-pedicelled, about 10-flowered; involucral scales lance-oblong, acutish, purple-tinged, glandular-puberulent dorsally, one or two of the outer lance-linear and shorter than the rest: corollas 6 mm. long, purplish: achenes prismatic, 3 mm. long, puberulent. — Collected by C. G. Pringle in forests at the foot of the Sierra de Ajusco in the Federal District, Mexico, 26 June, 1897, no. 7438, type (in herb. Gray), and earlier by Schaffner on Mt. Popocatapetl, altitude 2,700 m., September, 1855, also by Bourgeau in a forest of the Desert Viego near City of Mexico, 1865–66, no. 844. This species has the inflorescence and much the habit of *E. micranthum*, Less., which, however, has the leaves finely, but distinctly punctate on both surfaces and revolute at the base. See remarks under *E. glaucum*, below.

E. cardiophyllum. Stout, tall herb, short-pubescent or tomentulose and scabrous throughout; stem terete, striate, fistulose: leaves opposite, ovate-orbicular, short-acuminate, cordate with an open sinus, crenate, 1 to 1.6 dm. long, about as broad; petioles 2 or more cm. long, connate at the base: rounded terminal corymb loose, ample, 2 to 3.4 dm. broad, its branches subtended by bract-like much reduced leaves; bractlets linear or filiform; branches and pedicels dark purple, glandular-pubescent: heads 8 mm. long, 24-flowered; involucral scales about 15, linear, acute, purple, puberulent, unequal, not strongly imbricated: corollas 5 to 6 mm. long, exceeding the nearly white pappus: achenes black, white-puberulent under a lens. — Collected by C. G. Pringle on slopes of

cañons near Guadalajara, Jalisco, Mexico, 29 October, 1889, no. 2343, and earlier on the Rio Blanco in the same neighborhood by Dr. Edw. Palmer, October, 1886, no. 665. Both plants were distributed as *E. Benthamii*. However, Klatt's species of that name (which is a clear synonym of the earlier *E. Ehrenbergii*, Hemsl.) has ovate serrate not cordate leaves, more numerously flowered heads, etc.

E. CHAPALENSE, Wats., var. **salicifolium.** Leaves narrowly lanceolate, merely serrulate, acute at both ends, 4 to 6 cm. long, 1.2 to 1.4 cm. broad: scales of the involucre oblanceolate, broader than in the typical form. — Collected by C. G. Pringle on mountains near Lake Chapala, Jalisco, Mexico, 18 October, 1895, no. 7071. The leaves of the typical form are more than 4 cm. broad. The variety retains the floral characters and unequal pappus of the type.

E. chiapense. Stem terete, clothed with a dense purplish brown tomentum; internodes long (6 to 8 cm.): leaves opposite, ovate, acuminate, serrate-dentate except near the rounded base, dull green and except on the subpinnate nerves nearly glabrate above, paler and ferrugineous-tomentose upon the nerves and veins beneath, 1 to 1.4 dm. long, 6.5 to 8 cm. broad; petioles densely tomentose, 4 to 5.5 cm. long: heads numerous, 9 mm. high, about 24-flowered, borne in a compound round-topped corymb (1.5 dm. broad); the opposite branches and pedicels tomentose with purple gland-tipped hairs; involucre subsimple and scarcely imbricated; scales about 10, narrowly linear, attenuate, mostly 2-ribbed, 6 mm. long, pubescent: corollas glabrous, 5 mm. long, exceeding the dull white pappus; throat equalling the proper tube: achenes black, glabrous, tapering toward the base, 4 mm. long. — Collected by E. W. Nelson, near Pinabete, Chiapas, Mexico, altitude 2,000 to 2,400 m., 8 February, 1896, no. 3786. This species is related to *E. Ehrenbergii*, Hemsl., but has much narrower involucral scales, smaller heads, glabrous corollas, etc. It is also and perhaps still more closely related to *E. Donnell-Smithii*, Coulter, which, however, has pale obtusish involucral bracts, and flowers much smaller, scarcely more than half as long.

E. crassirameum. Large shrub or small tree, 3 to 5 m. high, glabrous throughout: branches thick, terete, soft-woody to the inflorescence, covered with a pale gray cortex: leaves opposite, petiolate, large, deltoid-ovate, thin, pellucid-punctate, glabrous, acuminate, repandly few-toothed at the sides, pinnately veined, becoming 1.5 dm. long and about equally broad; petioles 5 cm. in length: heads numerous, about 15-flowered, pedicellate in dense rounded compound corymbs (9 cm. in

breadth); involucres only 2 or 3 mm. long, little imbricated; the scales oblong, scarcely acute, unequal, ciliolate: flowers purple, 6 mm. in length. — Collected by C. G. Pringle on lava fields near Cuernavaca, altitude 1,500 m., no. 8271. The flowers on the fleshy naked branches were secured 16 February, and the leaves 29 September, 1899. Very distinct in habit from any species of which I can find record.

E. crenaeum. Erect herb; simple stems so grooved as to become cross-shaped in transverse section, pulverulent-puberulent; internodes mostly long, the lower more than 1 dm. in length: leaves opposite, decussate, ovate, obtusish, crenate, obtuse at the subentire base, finely and sparsely pubescent upon both surfaces, 9 to 11 cm. long, 7 to 8 cm. broad, 5-nerved from the base, slightly paler beneath; petioles relatively short, 1 to 1.3 cm. long, puberulent: heads about 50 in a terminal flat-topped corymb; pedicels filiform, flexuous, 5 mm. long; involucral bracts about 14, subequal, linear, acute, 1–3-nerved toward the base, 6 mm. long; flowers about 16; corolla probably white or pale, 5 mm. long, equalled by the white pappus; achenes glabrous, gray. — Collected by C. G. Pringle in springy places near Guadalajara, Jalisco, Mexico, 6 July, 1889, no. 2878.

E. desquamans. Copiously branched shrub; branches spreading, lignescent nearly to the tips; internodes mostly very short, soon covered by a grayish cortex: leaves opposite, petiolate, small, oval, obtuse or merely acutish at each end, 1.8 cm. long, 8 to 11 mm. broad, pinnately veined, finely serrate, at maturity green above and puberulent only under a good lens, paler beneath, when young clothed especially beneath with a close silvery web which soon breaks up into deciduous scalelike remnants; petioles 3 to 5 mm. long: inflorescences simple or nearly so, terminal, 5–9-headed, racemiform; pedicels opposite, 1 cm. long, bracteolate near the middle; involucre subsimple, of linear acute brownish puberulent subequal bracts about 13 in number and 5 mm. long: flowers about 15, 1 cm. long: corolla apparently white or pale, about equalled by the copious nearly white pappus: achenes smooth, black, shining, sharply angled. — Collected by C. G. Pringle on summit ledges of the Sierra de San Felipe, Oaxaca, altitude 3,100 m., 22 May, 1894, no. 5858. **Type in herb. Gray.**

E. GLAUCUM, Klatt, Leopoldina, xx. 89 (1884). The publication of this species has been unfortunate in several ways. The name first appears in print as "*E. glaucum*, Sch. Bip. ex A. Gray" in Hemsl. Biol. Cent.-Am. Bot. ii. 95 (1881), where Parry & Palmer's no. 335 from San Luis Potosi is referred to it. This mention cannot constitute

publication, however, as it is not accompanied by any description or synonymy whatever. The specimen cited is *E. micranthum*, Less. (*E. ligustrinum*, DC.).

Dr. Gray evidently got his idea of Schultz's *E. glaucum* from a plant now in herb. Gray collected by Schaffner on Popocatapetl and labelled in Schultz's own hand "*E. glaucum*, Sch. Bip. in Ehrenb. pl. Mex. no. 397." This plant is a species evidently near *E. micranthum*, Less., but differing in its impunctate leaves, &c.

In 1884 Dr. Klatt published, l. c., the first description of *E. glaucum*, but it is quite evident from the characters given as well as from a good drawing and some fragments in his herbarium that Dr. Klatt had quite a different plant before him from either *E. glaucum*, Gray (nomen nudum) or *E. glaucum*, Sch. Bip. in herb. (coll. Schaffner). Identical with Dr. Klatt's *E. glaucum* (which, being the first species described under that name, must stand) is *E. Orizabae*, Sch. Bip., described on the subsequent page (Leopoldina, xx. 90) by Klatt himself. This species is clearly shown by the excellent specimens distributed by Liebmann, no. 80, and Nelson, no. 1737 (from near Reyes, Oaxaca). The leaves are small, thickish, and subsessile and the branches numerous and ascending.

The original *E. glaucum*, Sch. Bip. in herb., which is quite different was also distributed by Schultz under a name approaching "*E. popocatapetlense*," but with some differences in the spelling. Mr. Hemsley refers *E. popocatapetlense* (nomen nudum) to Schlechtendahl and cites under it Ghiesbreght's no. 529 (which with its glandular-punctate leaves revolute at the base is *E. micranthum*, Less.). Schultz's name in Dr. Gray's hand appears on the label of Ghiesbreght's specimen in herb. Gray, and the substitution of Schlechtendahl as authority is certainly a clerical error in the Biologia Cent.-Am. and Index Kewensis. While Schultz's species seems to be a good one, it would seem unwise to launch it under a different spelling of a name already used in another significance. It has therefore seemed best to describe it as above under a new name *E. capnoresbium.*

The synonymy of the related species here mentioned may be stated thus: —

E. MICRANTHUM, Less. Linnaea, v. 138 (1830), not of Lag. (which was an *Ageratum*).

E. ligustrinum, DC. Prodr. v. 181 (1836).

E. semialatum, Benth. Pl. Hartw. 76 (1841).

E. popocatapetlense, Hemsl. Biol. Cent.-Am. Bot. ii. 99 (1881).

E. glaucum, Hemsl. l. c. 95 (1881), not Sch. Bip. nor Klatt.

E. CAPNORESBIUM, n. sp.

E. glaucum, Sch. Bip. in herb.

Also under another unedited name by Schultz.

E. GLAUCUM, Klatt, Leopoldina, xx. 89 (1884), not Sch. Bip. (nomen nudum) nor Hemsl. (nomen nudum).

E. Orizabae, Sch. Bip. in Klatt, l. c. 90 (1884).

E. heterolepis. Soft woody stems glabrous, lucid: leaves opposite, approximate, decussate, lance-oblong, entire, acute at each end, coriaceous, 1.2 to 1.4 dm. long, 3.6 to 4.8 cm. broad, nigrescent, pinnately and rather obscurely veined, pulverulent under a good lens; petioles 2 to 3 cm. long; heads 8 mm. long, 1 to 1.2 cm. in diameter, about 18-flowered, borne on filiform flexuous divergent pedicels in an open pyramidal panicle; scales of the involucre of two kinds, the inner long, linear, acute, about equalling the flowers, stramineous, at length deciduous; the outer (about 6 in number) ovate to lanceolate, acutish, much shorter, persistent, nigrescent: corollas 5 to 6 mm. long, with slender proper tube and distinctly enlarged throat: pappus of about equal length, somewhat sordid: achenes glabrous, 2 mm. long. — Collected by Dr. Sereno Watson in "eastern portions of Vera Paz and Chiquimula," Guatemala, 1885, no 65. Type in herb. Gray. A very distinct species with a calyculate involucre recalling a *Senecio*.

E. Heydeanum. Stems somewhat flattened, especially beneath the nodes, striate, tomentulose above, soon glabrate and slightly scabrous: leaves opposite, ovate to ovate-lanceolate, caudate-acuminate at the apex, cuneate at the base, entire, 3-nerved from above the base, sordid-tomentulose upon the nerves above, at first sordid-tomentose at length merely pubescent and slightly paler beneath, thin, 1.7 dm. long, 7 to 8 cm. broad; petioles sordid-tomentose, 4 to 9 cm. long: panicle opposite-branched, rounded, terminal, 1 dm. broad; heads about 22-flowered, 9 mm. long, short-pedicelled; involucral scales linear, acute, about 16, loosely imbricated, sordid-tomentulose on the outer surface, the outer shorter: corollas 5 to 6 mm. long, gradually enlarged from the base to the short-toothed limb, without sharply differentiated throat: achenes slender, 5 mm. long, hispidulous on the angles; pappus sordid, of nearly equal length. — *E. Ehrenbergii*, Coulter in J. D. Smith, Enum. Pl. Guat. iv. 74, not Hemsl. — Collected by Heyde & Lux on Rio de Las Cañas, Depart. Santa Rosa, Guatemala, altitude 800 m., March, 1892, no. 3427 of Mr. J. Donnell Smith's sets. Type in herb. Gray. *E. Ehrenbergii*, Hemsl., has serrate leaves, much larger heads, and broader involucral scales.

E. lanicaule. Stems 1 to 3 m. high, terete, striate, covered at least when young with shaggy tawny wool: leaves opposite, thickish, short-petioled, oblong, acuminate, sharply serrate, narrowed to a crisped base, appressed-villous above especially upon the veins, soft-pubescent upon the pinnate prominulous veins beneath, concolorous, slightly reticulate, 1.3 to 1.6 dm. long, 2 to 5 cm. broad; petioles lanate, 5 mm. long; inflorescence somewhat rigid, rather dense; lower branches widely spreading, thickish; bracts lance-linear, nearly equalling the heads; involucre sub-turbinate; the scales pluriseriate, elliptical, regularly imbricated, at length campanulately spreading, finely striate, ciliolate: flowers 1.2 cm. long: corolla 7 mm. long, cylindrical with little enlargement at the throat: pappus slightly tawny, of the same length: achenes columnar, puberulent on the angles. — Collected by Dr. Sereno Watson in the "eastern portions of Vera Paz and Chiquimula," 1885, nos. 74 a, 123. Types in herb. Gray. Nearly allied to the W. Indian *E. plucheoides*, Griseb., but differing in its larger heads, broad smoothish obtuse involucral scales, etc.

E. Loesenerii. Shrub, 2 to 3 m. high; branches stout, terete, opposite, curved-ascending, covered with a smooth gray cortex with longitudinal rifts, the lenticels not prominent; branchlets stoutish, elongated, covered with a fine ochraceous tomentum (sometimes reduced to a mere pulverulence): leaves opposite, petiolate, broadly ovate or oval, shallowly cordate, rounded or very obtuse with slight mucro at the apex, obsoletely serrate or entire, 5 to 6 cm. long, 4 to 5 cm. broad, subpalmately veined, pale green and pulverulent above, tomentulose and ochraceous beneath; petioles 2 to 3.5 cm. long, strongly channelled above, subconnate at the base: heads numerous, about 20-flowered, in terminal round-topped compound corymbs (9 to 12 cm. broad); pedicels 7 to 9 mm. long; involucres tomentulose, 3 mm. long, campanulate, the scales subequal, obtuse or barely acute, ciliate, ochraceous or purplish, scarcely at all herbaceous: corolla white or pale purple, 4 mm. long, glabrous, resinous-punctate on the teeth: pappus-bristles about 20, white, unequal; angles of the achene upwardly hispid. — Collected in Oaxaca by C. G. Pringle on calcareous hills, Las Sedas, altitude 1,800 m., 30 October, 1894, no. 6022, type (in herb. Gray). This plant was unfortunately determined as *E. sordidum*, Less., from the not altogether satisfactory description of that species. A comparison by Mr. J. M. Greenman of Mr. Pringle's plant with authoritative material of *E. sordidum* now shows that the latter is quite distinct, being in fact of the *Hebeclinium* group. *E. Loesenerii* has also been collected by E. W. Nelson along the Cuicatlan road, Valley of Oaxaca, altitude 2,100 to 2,400 m., 3 October, 1894, no. 1549; by

L. C. Smith, Rancho de Calderon, San Juan del Estado, altitude 1,700 m., 4 November, 1894, no. 275; and by C. & E. Seler at Cuauhtilla, 28 November, 1895, no. 1537, between Yanhuitlan and Teposcolula, Oaxaca, 3 December, 1895, no. 1430, and Cañada Sta. Maria, 8 December, 1895, no. 1596. I take pleasure in dedicating this species to Dr. Theodor Loesener of the Royal Botanical Museum at Berlin.

E. Nelsonii. Slender shrub, 1.6 to 3 m. high: stems terete, striate, dark brown, minutely gray-pubescent, somewhat flexuous; internodes rather long: leaves opposite, ovate, caudate-acuminate, dentate, about 7-nerved from the deeply cordate and more or less hastate base, membranaceous, dull-green and finely gray-pubescent upon both surfaces, 8 to 10 cm. long, 5 to 8 cm. broad; petioles flexuous, 3 to 4.5 cm. long, puberulent: heads about 16-flowered, numerous, 8 mm. long, borne in opposite axillary and terminal trichotomous nutant corymbs; peduncles and pedicels pubescent, filiform; involucral scales very unequal, light green, striate, elliptical, obtuse, rounded or erose at the summit, imbricated in 3 or 4 rows: corollas at anthesis 4 mm. long, of essentially uniform diameter throughout, thus not clearly differentiated into tube and throat, pale, said to be yellowish: styles dark, strongly clavate; achenes (of the genus) hispidulous, 3 mm. long, tapering almost from the summit to the base, at length subglabrate and nearly black. — Collected by E. W. Nelson between Ayusinapa and Petatlan, Guerrero, 14 December, 1894, no. 2144; by C. G. Pringle on Monte Alban, Oaxaca, altitude 1,700 m., 21 December, 1894, no. 5637 (leaves less deeply cordate); and by C. & E. Seler, in mountain woods between Yanhuitlan and Teposcolula, Oaxaca, Mexico, 3 December, 1895, no. 1447. Types in herb. U. S. Nat. Museum, herb. Royal Bot. Museum, Berlin, and herb. Gray. This species has the involucre and clavate style-branches of a *Brickellia*. The achene, however, is distinctly that of a *Eupatorium*.

E. Oerstedianum, Benth. in Oersted, Vidensk. Meddel. 1852, p. 74. Add syn. *E. vernonioides*, Coult. Bot. Gaz. xx. 45.

E. oresbium. Upper part of the stem, peduncles, and pedicels loosely pubescent with a sparse more or less deciduous tawny wool: leaves opposite, ovate, acuminate, rounded or subcordate below, very shortly cuneate at the attachment of the petiole, cuspidate-denticulate, thin, very finely pellucid-punctate, green and glabrous above, scarcely paler and conspicuously villous upon the nerves beneath, 5–7-nerved from a point somewhat above the base, 1.2 to 1.4 dm. long, 1 dm. broad; petioles 8 to 10 cm. long, puberulent, also tomentose along the grooved upper surface: corymb open, rounded or subpyramidal, tri-

chotomous; pedicels filiform, 5 mm. long; involucral bracts thin, pale green, very unequal, the inner oblong, obtuse, ciliate and minutely puberulent, 6 mm. long, the outer much shorter, ovate-lanceolate, acute, glabrous: flowers about 16: corolla purple, 6 mm. long, considerably exceeding the delicate bright white pappus: achenes glabrous, dark gray, 2 mm. long. — Collected by C. G. Pringle in a wet mountain cañon above Cuernavaca, Mexico, altitude 2,000 m., 15 February, 1899, no. 8030. Three to five meters high.

E. PACACANUM, Klatt, Botanisches Beiblatt zur Leopoldina, 1895, p. 3. Add syn. *E. roseum*, Klatt. Bull. Soc. Bot. Belg. xxxi. 194 (1892), not Gard. Both of Dr. Klatt's species here mentioned rest upon Pittier's no. 3324. The existence of an earlier valid *E. roseum* necessitates the adoption of Dr. Klatt's second name.

E. phoenicolepis. Stems terete, probably herbaceous, purplish brown, covered with dense very short glandular sordid tomentum: leaves opposite, ovate, acuminate, cordate with a narrow sinus, serrate, dull green, pulverulent and sometimes bullate above, paler, tomentose and reticulate-veiny beneath, 3-nerved from near the base, 5 to 7 cm. long, 2.4 to 4.5 cm. broad; petioles 1.4 to 3 cm. long; bracts similar to the leaves except in their smaller size, extending up into the many-headed opposite-branched round-topped panicle; heads 1 cm. in height, about 18-flowered; bracts of the involucre purple, flat, striate, acutish, very unequal, regularly imbricated in 4 to 5 series, the outer very short, ovate, dark and dull, the inner lighter and somewhat lucid, about equalling the flowers: corollas apparently deep purple or crimson, 5 mm. long, equalling the delicate and not very copious pappus: style-branches clavate; achenes 2.2 mm. long, upwardly hispidulous under a lens. — Collected by E. W. Nelson between San Cristobal and Teopisca, Chiapas, Mexico, 4 December, 1895, no. 3475. Types in herb. Gray and herb. U. S. Nat. Museum. A species with the styles and to some extent the involucre of a *Brickellia* but the achenes of a *Eupatorium*. It is most nearly related to *E. Bigelovii*, Gray, which, however, has much more acute scales and smaller leaves not cordate at the base.

E. photinum. Glabrous up to the slightly pulverulent-puberulent inflorescence, herbaceous, erect, 5 dm. high; stems terete, subsimple, dark purple, with rather long internodes: leaves opposite, ovate or ovate-lanceolate, 7 to 11 cm. long, 3 to 4 cm. broad, caudate-attenuate, serrate except near the subacute base, green, glabrous, and somewhat lucid upon both surfaces, 3-nerved from near the base; reticulate veins slightly translucent; petioles purple, 1.5 to 2 cm. long: heads small,

5 mm. high, about 16-flowered, borne in small round-topped corymbs at the ends of the opposite branches, also forming a larger dense terminal corymb; pedicels 4 mm. long; involucral bracts subequal, oblong, obtuse, pale green, striate, 3 mm. long: corollas nearly white, 2.5 mm. long, the well-marked throat nearly as long as the proper tube: pappus (not copious) about equalling the corolla: achenes black, 1.2 mm. long, minutely roughened on the angles. — Collected by C. G. Pringle on shaded cliffs of the Sierra de Tepoxtlan, 24 km. northeast of Cuernavaca, Mexico, altitude 2,300 m., 7 February, 1899, no. 8029.

E. platyphyllum. Shrubs with stems pithy, 6-angled, stoutish but flexuous as if scandent, at first sordid tomentulose-pulverulent, at length glabrate; internodes rather long: leaves opposite, 1.2 to 1.8 dm. long, the largest 2.2 dm. broad, shallowly 3-lobed, acuminate, rounded below to a very shortly cuneate base, thin, green and glabrous or nearly so on each surface, 3-nerved from the base, coarsely reticulate-veined, the veins pale and slightly prominulous beneath; lobes acuminate, cuspidate-denticulate; petioles slender, 3 cm. long: heads large, numerous, 60–75-flowered, aggregated at the ends of the slender ascending branches of a broad somewhat pyramidal panicle; pedicels filiform, about 1 cm. long; involucre campanulate, 1 cm. high, 1.3 cm. in diameter; scales pluriseriate, regularly but loosely imbricated, very unequal in length, stramineous, striate, scarious and erose near the rounded tips: corollas 6 mm. long, probably white, very slender, without distinctly enlarged throat, equalled by the copious bright white pappus: achenes glabrous, 2 mm. long. — Collected by E. W. Nelson, near Chicharras, Chiapas, Mexico, altitude 900 to 1,800 m., 6 February, 1896, no. 3765; also by E. A. Goldman at Metlaltoyuca, Puebla, no. 78. Types in herb. Gray and herb. U. S. Nat. Museum.

E. Saltivarii, Sch. Bip. in Rob. & Sea. Proc. Am. Acad. xxviii. 108 (1893). Add syn. *E. abronium*, Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 355 (1894).

E. scabrellum. Stems angled and furrowed above, finely grayish pubescent or tomentulose: leaves subalternate (at least the upper ones), petiolate, ovate, scarcely acute, subcordate or rounded at the base, crenate-denticulate, 5 to 16 cm. long, 3 to 12 cm. broad, thin but of harsh texture, green upon both sides not paler beneath, glabrous to the naked eye, but somewhat scabrous and under a lens puberulent, palmately 3-nerved somewhat above the pinnately several-nerved base: inflorescence an alternate-branched many-headed racemose panicle, its lower branches (subtended by leafy bracts) 1.2 dm. long, naked below,

branched and somewhat thyrsoid from the middle, pubescent; involucral bracts about 10, oblong, pubescent, green, subequal (only 2.5 mm. long) except the 1 or 2 calyculate external ones: flowers about 10: corollas white, 2.5 mm. long, the throat funnel-formed without sharp demarcation from the relatively short proper tube: achenes at length black, 1.5 mm. long: pappus white, equalling the corolla, not copious. — Collected by E. A. Goldman near Batopilas, Chihuahua, Mexico, altitude 1,700 to 2,000 m., 4 to 5 October, 1898, no. 197. Types in herb. U. S. Nat. Museum and herb. Gray.

E. SCORODONIOIDES, Gray, var. **grossedentatum.** Leaves deltoid, hastate, rather deeply cordate, coarsely crenate-toothed: pubescence less copious and shorter than in the typical form. — Collected by C. G. Pringle on limestone hills near Tula, Hidalgo, 20 September, 1899, no 8244.

E. Selerianum. Branches opposite, weak, flexuous, terete, striate, finely pubescent: leaves opposite, petiolate, ovate, abrupt or cordate at the base, acuminate or narrowed to an obtusish tip, glabrate above, gray-tomentulose beneath, 1.5 to 3 cm. long, two-thirds as broad, crenate; petioles 1 to 1.5 cm. long: inflorescence a lax flat-topped compound corymb; the branches filiform, opposite or alternate, bearing 1 to several small nearly orbicular short-petioled bracts (4 to 5 mm. in diameter); pedicels 4 to 7 mm. long, minutely bracteolate; scales of the involucre about 13, oblong, pale green or stramineous, striate, obtuse or erose at the summit, the inner about 4 mm. long, the two or three outer considerably shorter; heads about 15-flowered; flowers apparently pale or white: corolla 2.3 mm. long; the throat exceeding the proper tube: pappus white, not very copious: achenes black, glabrous. — Collected by C. & E. Seler, at Hacienda Petapa, Tuxtla, Chiapas, Mexico, 1896, no. 1939. Type in herb. Gray. This species is related to *E. guadalupense*, but is probably perennial and differs much in pubescence and in the presence of the orbicular bracts.

E. Smithii. Shrub, 1 to 2 m. high, cinereous-puberulent or tomentulose: branches opposite, spreading, covered with fissured buff cortex: leaves opposite, ovate inclining to be deltoid, rounded at the apex, truncate or subcordate at the base, pale green and merely pulverulent above, cinereous-tomentulose and veiny beneath, crenate to entire, 2.3 to 6 cm. long, 2 to 4.5 cm. broad; petioles 1 to 1.5 cm. long, channelled above: inflorescences trichotomous round-topped corymbose panicles, seldom over 5 cm. in breadth; pedicels and pale green subherbaceous loosely imbricated obtusish involucral scales slightly woolly: flowers about 23 in a head, 7 mm. in length; corollas white, gradually enlarged from the

base and without definitely marked throat; segments ovate-oblong. — Collected in Oaxaca by C. G. Pringle, on Monte Alban, altitude 1,800 m., 8 October, 1894, no. 4959, type (in herb. Gray); by L. C. Smith on mountains of San Juan del Estado, altitude 2,100 m., 4 November, 1894, no. 274; and by C. & E. Seler, above Porian, 27 November, 1895, no. 1547. This species stands very close to *E. Loesenerii* and may eventually prove a variety of it, but as yet, although each species has been independently secured by three collectors, no intergradation has been observed. The differences are as follows: *E. Smithii* has smaller leaves of a more deltoid contour and with a cinereous rather than ochraceous indumentum; its inflorescences are considerably smaller, while the involucral bracts are larger, more herbaceous, and less closely appressed; finally the teeth of the corolla are, on careful comparison, longer and ovate-oblong rather than deltoid as in *E. Loesenerii*.

E. Thieleanum, Klatt, Bull. Soc. Bot. Belg. xxxi. 191 (1892). Add syn. *E. myrianthum*, Klatt, Botanisches Beiblatt zur Leopoldina, 1895, p. 3, founded on the same specimens and described in the same words.

E. Valverdeanum, Klatt, Bull. Soc. Bot. Belg. xxxi. 188, (1892). Add syn. *E. chrysocephalum*, Klatt, Botanisches Beiblatt zur Leopoldina, 1895, p. 2. Dr. Klatt's two species are founded upon the same specimens and their descriptions are identical. The earlier name must, of course, be adopted.

E. Vitalbae, DC. Prodr. v. 163 (1836). Add syn. *E. Ecuadorae*, Klatt, Ann. k. k. Naturh. Hofmus. Wien, ix. 356 (1894).

Mikania eriophora, Sch. Bip., var. **chiapensis**. Pubescence more hirsute than in the type, the hairs spreading, not at all felted or interplexed: leaves large, deeply cordate, becoming 2.2 dm. long, and 1.7 dm. broad: involucral scales early glabrate. — Collected by E. W. Nelson at Chicharras, Chiapas, Mexico, altitude 900 to 1,800 m., 6 February, 1896, no. 3769. This variety has much the habit of *M. pyramidata*, J. D. Smith, but that has the leaves smaller, rounded at the base, and the pubescence subappressed on the pedicels.

Porophyllum brachypodum. Shrub, scarcely or not at all glaucous; stems somewhat rigid, branched toward the end, lucid: leaves (only the upper ones shown) lanceolate to linear, narrowed to an obtusish glanduliferous point, cuneate at the base, entire, 3.5 cm. long, 4 to 8 mm. broad; petioles 4 mm. long; glands on the blade all marginal, large, subremote, on the narrower leaves often alternate: pedicels 5 to 8 mm. long, slightly clavate, spreading; involucral bracts oblong, rather broad,

obtuse, tufted at the cuspidate apex, 8 to 9 mm. long, usually carinate, pale green with broad diaphanous margins; glands biseriate, approximate to the keel, elliptical or oblong, not linear, amber colored: flowers about 16: corollas 7 mm. long, at anthesis about equalling the sordid pappus; the slender proper tube about twice the length of the throat: achenes slender, dull black, upwardly hispid, 7 to 8 mm. long. — Collected by Dr. J. N. Rose at Guaymas, Sonora, Mexico, 5 to 11 June, 1897, no. 1272. Near *P. obtusifolium*, DC., which, however, has more acute dark purple involucral scales marked with dark linear glands.

Liabum Pringlei, Rob. & Greenm. Proc. Am. Acad. xxxii. 49 (1896). The type specimen of this species published by clerical error as no. 6215 is 6214 of Pringle's Plantae Mexicanae.

Perezia Nelsonii. Tufted with rusty wool at the slightly decumbent base; stem soon erect (probably 1 m. tall), subterete, striate, branched, leafy about to the middle, glabrous and smooth, purplish: leaves large (1.7 dm. long, 6 to 8 cm. broad), firm, reticulated, oblong-oblanceolate, rounded, obtuse or acute at the apex, cordate-clasping at the base, sharply dentate with small spreading teeth: branches ascending, nearly naked: heads few, large, many-flowered, 2.5 to 3 cm. long and broad; pedicels 2 to 5 cm. long, bearing several small lanceolate attenuate appressed scale-like bracts passing gradually into the broader ovate to oblong or at length lance-oblong involucral scales, these green with a slight purple tinge, ciliolate, imbricated in about 7 rows, the middle and inner ones obtuse or rounded and mucronate at the tips, the outer acute, slightly spreading and pungent: purple strongly bilabiate corolla 1.5 cm. long: columnar granulated achene 4 mm. long. — Collected by E. W. Nelson on mountains near Talpa, Jalisco, Mexico, altitude 1,400 to 1,500 m., 7 March, 1897, no. 4037. A species near *P. michoacana* and *P. cuernavacana*, but clearly distinct from either.

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By M. L. Fernald.

Presented by B. L. Robinson, March 14, 1900. Received April 19, 1900.

I.—A SYNOPSIS OF THE MEXICAN AND CENTRAL AMERICAN SPECIES OF SALVIA.

In his monograph of the *Labiatae* in De Candolle's Prodromus, Bentham (1848) recognized 118 species of *Salvia* in Mexico and Central America, several of them, however, being known only from the original descriptions.

In the botanical portion of Biologia Centrali-Americana, Mr. Hemsley enumerated 135 species, but a number of them were unknown to him, seven have proved to be identical with others there listed, and the records of two are based upon their occurrence in adjacent portions of the United States but not in Mexico proper. Thus excluding these nine species, there were recorded by Mr. Hemsley, in 1887, 126 Mexican and Central American Salvias.

During the past quarter century the unprecedented activity in the botanical exploration of those countries has brought together in *Salvia*, as in many other large genera, an abundance of material for study. Many of these recent collections have been critically examined, and a large number of species based upon them have been described. The collections of the past decade, furthermore, contain very many unique plants which cannot be referred to any of the species already published. These species, together with those described in the last half-century, since the publication of Bentham's treatment of the group in the Prodromus, increase the number of known Mexican and Central American Salvias by nearly one hundred.

In order to place before students of Mexican botany many previously undescribed forms and to show more clearly than could otherwise be done their affinities, a synopsis has been prepared of all the known Mexican and Central American species. In the preparation of this work the general divisions of Bentham have been adopted, though with

more material at hand it has been necessary in many cases to amplify or alter the limits of groups as defined by him.

It was hoped that the treatment of the genus published by M. le Professeur Jean Briquet in "Engler & Prantl's Natürlichen Planzenfamilien"[1] would be of assistance in preparing this synopsis; but, except for the introduction of somewhat helpful minor divisions of the groups, that work adds little to the earlier conclusions of Bentham. In fact, so far at least as the Mexican species are concerned, Professor Briquet's translations of Bentham's sectional and subsectional diagnoses are most unfortunate, often so far so as quite to contradict the true characters of the plants he is supposed to be describing, and entirely to mislead the student who attempts to follow his synopsis. In the description of the very first group, the § *Micranthae*, for example, Bentham says: "Corolla vix 3-linearis calyce *dimidio vel rarius subduplo longior*" (corolla about 3 lines long, once and a half or rarely almost twice as long as the calyx), proportions which are maintained almost without exception by the species of that section. Yet this is rendered by Briquet "Blkr. [Blumenkrone] klein, *die Hülfte der Länge des Kelches erreichend, seltener 2 mal grösser*" (corolla small, half the length of the calyx, rarely twice longer) although the species which constitute the section have the corolla as defined by Bentham. Briquet's description of the § *Microsphaceae*, included by Bentham in the Prodromus under § *Micranthae*, reads: "Blkr. klein, *kaum die Hülfte der Länge des Kelches erreichend*" (corolla small, scarcely half as long as the calyx), thus suggesting plants with the calyx definitely exceeding the corolla, instead of the species, enumerated by him, with the corolla distinctly exceeding the calyx. Again in the § *Brachyanthae* Bentham describes the lower lip of the corolla as follows: "labium patens . . . *galea longius*" (lip spreading . . . longer than the galea), while Briquet, rendering it into German says ". . . ausgebreiteter Unterlippe, diese *nicht* länger als die Oberlippe" (. . . the spreading lower lip, this not longer than the upper lip [galea]), thus absolutely contradicting the character of the corolla as shown by the species included by him in the section.

Of the 217 Salvias recognized in the present paper, specimens — or in seven cases merely authentic plates — of 174 species have been examined. Of the remaining 43 species very many, although well described, were unknown to Bentham and have not been identified with recently collected material. Others recognized by Bentham as of doubt-

[1] Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3, 270–286.

ful status are here noted, although they are so incompletely characterized as to make their identification without access to the types quite impossible. In such cases the traditional conception of the plant has been maintained as far as possible, though it is highly probable that future study of these little-known types will identify some of them with better known species.

The descriptions of two species recently published from old manuscripts contain so little of specific significance that it is impossible to say upon what plants they were based. These are *S. azurea* and *S. dichroma*, La Llave in La Naturaleza, vii (1885) Apend. 82.

A European species, *S. Sclarea*, L., is often cultivated in central Mexico and is sometimes distributed in exsiccatae as if an indigenous plant (for example, see Schaffner's no. 49 from the mountains of San Luis Potosi).

In the study of species of § *Membranaceae* Mr. N. E. Brown of the Royal Gardens at Kew has rendered very valuable service by comparing specimens submitted to him with the types of Bentham's species.

SYNOPSIS OF SPECIES.

(As far as possible the sectional numbers and descriptions have been maintained as given in the Prodromus.)

Section VII. CALOSPHACE, Benth. Calyx ovate, tubulose or campanulate, the upper lip entire or shortly tridentate, the teeth approximate, and the middle one longest. Corolla-tube exserted or included, not annulate within, but occasionally furnished with 2 teeth near the base. Upper lip (galea) straight or concave, entire or often short-emarginate; the lower with spreading lobes. Anterior portion of the connective deflexed, linear, longitudinally connate or approximate, occasionally a little dilated, and rarely bearing an empty adnate anther-cell.

§ 1. MICRANTHAE, Benth. Bracts small, mostly deciduous. Corolla blue or white, short, 8 mm. or less (in one species nearly 1 cm.) in length, very slightly or rarely almost twice exceeding the calyx; the tube generally ventricose; the galea straight.

* Corolla very small, 3 to 5 mm. long: calyx glandular.

+ Calyx-lobes blunt.

1. S. OCCIDENTALIS, Swartz, Fl. Ind. Occ. i. 43; Benth. l. c. 296; Gray, Syn. Fl. ii. pt. 1, 370; Hemsl. l. c. 562; Briq. l. c. 277. *S. procumbens*, Ruiz & Pav. Fl. Per. & Chil. i. 27, t. 39, fig. a. *S. radicans*, Poir. Dict. vi. 621. *Verbena minima chamaedryos folio*, Sloane, Jam. i.

172, t. 107. *Hyptis glandulosa*, Sieb. Fl. Mart. Exs. no. 151, fide Benth. l. c. — Common in tropical and subtropical America, extending north to Vera Cruz. VERA CRUZ, Mt. Orizaba (*Botteri*, no. 394); Cordoba (*Asa Gray*): YUCATAN, waste ground near Merida, April, 1887 (*Porfirio Valdez*, no. 55): GUATEMALA, Coban, Dept. Alta Verapaz, alt. 1,320 m., Nov. 1886 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 1090); Santa Rosa, alt. 770 to 920 m., May, Dec., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, nos. 3014, 4399): HONDURAS, San Pedro Sula, Dept. Santa Barbara, alt. 250 m., May, 1888 (*C. Thieme* in exsicc. J. D. Smith, no. 5422): NICARAGUA (*Charles Wright*): COSTA RICA, Ujaras (*Oersted*); Cartago, alt. 1,300 m., Dec., 1887 (*Juan J. Cooper*) in exsicc. J. D. Smith, no. 5901; roadsides San José, Jan., 1893 (*Ad. Tonduz*, no. 7280).

+ + Calyx-lobes subulate-mucronate.

++ Bracts deciduous.

2. S. MISELLA, HBK. l. c. 290; Benth. l. c. 297; Hemsl. l. c. 561; Briq. l. c. — Described from near Acapulco: perhaps the same as the next.

++ ++ Bracts persistent.

3. S. OBSCURA, Benth. Lab. 245, & in DC. l. c. 297; Millspaugh, Field Columb. Mus. Bot. ser. i. 43. *S. privoides*, Gray, Syn. Fl. l.c. 371, not Benth. *S. occidentalis*, Millsp. l. c., in part, not Swartz. *S. occidentalis*, var.? *Garberi*, Chapm. Bot. Gaz. iii. 10. — Range similar to that of *S. occidentalis*, extending north to Sinaloa and Lower California. LOWER CALIFORNIA, La Paz, 1890 (*Edw. Palmer*, no. 10): SINALOA, Mazatlan, Dec., 1894 (*F. H. Lamb*, nos. 311, 317): GUERRERO, Acapulco, 1895 (*Edw. Palmer*, no. 244): VERA CRUZ, Valley of Cordova, Dec. 18, 1865 (*Bourgeau*, no. 1504): YUCATAN, roadside, near Izamal, Jan. 14, 1895 (*Millspaugh*, no. 90); Island of Cozumel, 1895 (*G. F. Gaumer*, no. 394).

* * Corolla 6 to 8 mm. long.

+ Calyx glandular.

++ Bracts caducous.

= Stem villous: leaves ovate-lanceolate, rufous-tomentose beneath: verticels 4–6-flowered: calyx with obtuse lobes.

4. S. INCONSPICUA, Benth. Lab. 247, & in DC. l. c. 298; Hemsl. l. c. 558; Briq. l. c. 278. — Described from Mexico. Not seen.

= = Stem pubescent with long spreading gland-tipped hairs: leaves broad-ovate, slightly puberulent beneath: verticels 2-flowered: calyx with acuminate lobes.

5. S. PODADENA, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 131. — Described from OAXACA. Not seen.

++ ++ Bracts persistent.

= Leaves villous or long-pilose beneath.

a. Leaves canescent on both faces, 1 to 3 cm. long, on slender naked petioles : calyx-lobes acutish.

6. S. SEROTINA, L. Mant. 25 ; Jacq. Ic. Rar. i. 1, t. 3 ; Benth. l. c.; Hemsl. l. c. iv. 107 ; Briq. in Engl. & Prantl, l. c. *S. dominica*, Vahl. Enum. i. 233 ; Swartz, Obs. 18, t. 1. fig. 1, not L. — Florida and the West Indies. Reported from Cozumel Island, YUCATAN.

b. Leaves ferrugineous-villous beneath, 1 dm. or less long, cuneate to winged petioles : calyx-lobes setaceous-mucronate.

7. S. PRIVOIDES, Benth. Bot. Sulph. 150, & in DC. l.c. 297 ; Hemsl. l. c. ii. 563 ; Briq. l. c. — Southern Mexico and Central America. JALISCO, Guadalajara, Sept., 1886 (*Edw. Palmer*, no. 498) ; cool shady places, barranca near Guadalajara, Nov. 5, 1888 (*C. G. Pringle*, no. 1727) ; San Sebastian, alt. 1,185 to 1,540 m., March 16, 1897 (*E. W. Nelson*, no. 4072) : MORELOS, Cuernavaca, Nov. 14, 1865 (*Bourgeau*, no. 1239) : OAXACA, Jayacatlan, alt. 1,320 m., Sept. 10, 1894 (*L. C. Smith*, no. 174).

= = Leaves short-pilose or glabrate beneath.

a. Inflorescence an oblong raceme, 4 to 7 cm. long, not secund : calyx tubulose-campanulate, in fruit 7 mm. long.

8. S. MICRANTHA, Vahl. Enum. i. 235 ; Benth. l. c. 298 ; Hemsl. l. c. 561 ; Briq. l. c. *S. bullata*, Ort. Dec. ix. 109 ; Jacq. Hort. Schoenb. iv. 41, t. 481. *S. serotina*, Vahl. l. c. 232, not L. *S. occidentalis*, Millsp. l. c. in part, not Swartz. — Tropical America, in Mexico known only from the Yucatan coast. YUCATAN, streets of Dolores, Island of Mugeres, Jan. 1, 1895 (*Millspaugh*, no. 18) ; without locality, 1896 (*Porfirio Valdez*, no. 31). *S. orbicularis*, Benth. Bot. Sulph. 151, from Panama seems to differ from the species only in its fruticose base.

b. Inflorescence secund, loosely-flowered.

1. Calyx-tube bearing long straight spreading setiform glandless hairs mixed with the shorter gland-tipped ones ; upper lip entire : racemes simple, elongated, becoming 1 to 1.5 dm. long.

9. **S. setosa.** Annual, 2 to 5 dm. high ; the stems slightly appressed-retrorse-setulose on the angles : leaves ovate or rhombic-ovate, thin, acute or blunt at tip, cuneate at base to winged petioles, crenate-serrate, 8 cm. or less in length, sparingly appressed-setulose above, paler and minutely puberulent or glabrate beneath : racemes stiff ; verticels mostly 2-flowered, all becoming remote, the lowest 1.5 to 2.5 cm. apart : bracts

lance-subulate, 5 to 7 mm. long: pedicels 2 to 4 mm. long: calyx in anthesis 5 mm., in fruit 9 mm. long; the lobes equalling the tube, narrow-ovate, with long subulate aristiform tips, the pubescence less spreading than on the tube: corolla 7 to 8 mm. long; the sparingly pilose lips deep blue. — *S. privoides*, Gray in Wats. Proc. Am. Acad. xxi. 435; Rose, Contrib. U. S. Nat. Herb. i. 110; not Benth. — Northwestern Mexico. CHIHUAHUA, Hacienda San José, 1885 (*Edw. Palmer*, no. 64): SONORA, by shaded water-courses and in cañons, Alamos, Sept., 1890 (*Edw. Palmer*, no. 680, 681).

2. Calyx pubescent with gland-tipped hairs; upper lip generally tridentate: racemes paniculate, 5 cm. or less in length.

10. **S. lateriflora.** Bushy-branched annual, 2.5 to 3 dm. high: stems sparingly retrorse-pilose: leaves ovate or rhombic-ovate, thin, blunt or acutish at tip, cuneate to slender petioles 5 cm. or less long, coarsely crenate-dentate, minutely setulose on both faces or glabrate: flowers solitary or in 2's, all remote, the lowest 0.7 to 1 cm. apart: bracts ovate, acuminate, 1 to 2 mm. long: pedicels 2 to 4 mm. long: calyx in anthesis 2 to 3 mm., in fruit 5 to 6 mm. long; the tube twice exceeding the broad blunt subulate-tipped lobes. — SONORA, about abandoned gardens, Guaymas, Oct., 1887 (*Edw. Palmer*, no. 320). Habitally resembling *Scutellaria lateriflora*. A fragmentary specimen collected by *Xantus* at Cape St. Lucas, LOWER CALIFORNIA, may belong here.

+ + Calyx not glandular.

++ Leaves thin, membranaceous, the primary ones 4 to 9 cm. long: verticels 6-many-flowered.

11. S. TILIAEFOLIA, Vahl. Leaves broad- or rhombic-ovate, cordate truncate or rounded-cuneate at base, sparingly pubescent on both faces, dark green above. — Symb. iii. 7; Jacq. Hort. Schoenb. iii. 2. t. 254; Benth. l. c. 299; Hemsl. l. c. 566. *S. fimbriata*, HBK. l. c. 299, t. 149. — Common in tropical America, extending northward through Mexico. CHIHUAHUA, Valley of Chihuahua, Sept. 17, 1885 (*C. G. Pringle*, no. 556; damp places, Cañon de Pilares, Sept. 22, 1891 (*C. V. Hartman*, no. 749): COAHUILA, Saltillo, 1848–49 (*J. Gregg*, no. 542); Soldad, Sept., 1880 and in shaded places, Saltillo, Sept., 1880, 1898 (*Edw. Palmer*, nos. 1062, 335): DURANGO, abundant in shade near Durango, Sept., 1896 (*Edw. Palmer*, no. 572): SAN LUIS POTOSI, in deep shade near the city, 1876 (*Schaffner*, no. 674), alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, nos. 743, 746½): AGUAS CALIENTES (*Hartweg*, no. 159): MEXICO, Valley of Mexico, May 5, 1865 (*Bourgeau*, no.

122) : Vera Cruz, Orizaba (*Botteri*, nos. 533, 869), Aug. 13, 1891 (*Seaton*, no. 304) ; Cordoba (*Asa Gray*) : Oaxaca, Monte Alban, alt. 1,900 m., Oct. 11, 1895 (*L. C. Smith*, no. 949) : Guatemala, Santiago, Dept. Zacatepéquez, alt. 2,000 m., 1891 (*Rosalía Gomez* in exsicc. J. D. Smith, no. 816) ; Castillas, Dept. Santa Rosa, alt. 1,230 m., Sept., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4055) : Costa Rica, Cartago, alt. 1,300 m., Nov., 1888 (*Juan J. Cooper* in exsicc. J. D. Smith, no. 5900) ; San José, July, 1892, and San Francisco de Guadalupe, Dec., 1893 (*Ad. Tonduz*, nos. 701, 8456). See note under *S. Chia*. *S. flexuosa*, Presl in Benth. Lab. 248, is perhaps only a glabrate form of this species, apparently represented by *Botteri's* no. 395 from Orizaba.

Var. **cinerascens.** Whole plant cinereous with fine puberulence. — Jalisco, barranca near Guadalajara, Oct. 3, 1891 (*C. G. Pringle*, no. 5176).

++ ++ Leaves firm, small, 1 to 2.5 cm. long : verticels 2–4-flowered.

= Herbaceous, erect : leaves broad-ovate, cordate, minutely pubescent : lower verticels in axils of upper foliar leaves.

12. S. humilis, Benth. Lab. 247, & in DC. l. c. 298 ; Hemsl. l. c. 558 ; Briq. l. c. — Described from "Mexico." Not seen.

= = Diffusely branching from woody base : leaves narrowly rhombic-ovate, or oblong-ovate, cuneate, densely pilose-setulose beneath : racemes short-peduncled.

13. **S. pusilla.** Stems 1 to 2.5 dm. long, slender and wiry, puberulent and hoary with fine spreading setulose hairs ; more or less diffusely branched : leaves blunt or acutish, irregularly more or less serrate, green above, pale beneath, long-setulose on both faces or glabrate above, on short slender petioles : peduncles 1.5 to 4 cm. long : racemes 1 to 8 cm. long ; the verticels all remote, the lowest becoming 2 to 2.5 cm. apart : bracts ovate, 3 to 4 mm. long, firm and essentially persistent : pedicels very short : calyx white-setulose, in anthesis 2 to 3 mm., in fruit 5 mm. long ; the tube once and a half longer than the acuminate lobes : corolla blue, 7 mm. long ; the tube short-exserted ; the pilose galea twice exceeded by the lip : style densely bearded. — Oaxaca, vicinity of Yalalag, alt. 1,230 to 2,400 m., July, 1894 (*E. W. Nelson*, no. 958) ; Sierra de San Felipe, alt. 2,160 m., Sept. 23, 1895 (*C. Conzatti*, in exsicc. L. C. Smith, no. 708).

* * * Corolla 9 to 10 mm. long.

+ Leaves cuneate or rounded-cuneate at base : calyx subglabrous.

++ Leaves oblong-lanceolate.

14. S. ourophylla, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 126. — Described from Costa Rica. Not seen.

++ ++ Leaves ovate or ovate-elliptic.

15. S. PERMIXTA, Briq. l. c. 129. — Described from COSTA RICA. Not seen.

+ + Leaves hastate at base: calyx glandular.

16. S. COSTARICENSIS, Oersted in Kjoeb. Vidensk. Meddel. (1853) 39; Hemsl. l. c. 555. — COSTA RICA, Cartago, alt. 1,300 m., Dec., 1887 (*Juan J. Cooper* in exsicc. J. D. Smith, no. 5895); San José, Oct., 1892 (*Ad. Tonduz*, no. 7158).

§ 2. MEMBRANACEAE, Benth. Flowers as in the *Micranthae* or a little larger. Bracts suborbiculate, persistent, membranaceous, veiny, equalling or exceeding the calyx.

* Leaves narrow-ovate, cuneate or narrowed at base.

+ Calyx glabrous, subtruncate, with very short teeth: verticels approximate, forming a spiciform raceme 4 to 8 cm. long: bracts and calyces blue or roseate.

17. S. LOPHANTHA, Benth. in DC. l. c. 301; Hemsl. l. c. 560, in part; Briq. in Engl. & Prantl, l. c. — GUATEMALA, Santa Rosa, alt. 1,230 m., Oct., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4051).

+ + Calyx pubescent.

++ Calyx canescently short-pilose, not viscid: verticels remote, forming a raceme 1 to 2.5 dm. long.

18. S. MOCINOI, Benth. Lab. 271, & in DC. l. c. 300; Hemsl. l. c. 561; Briq. l. c. — GUATEMALA, Laguna de Ayarza, Dept. Jalapa, alt. 2,460 m., Sept., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4048).

++ ++ Calyx viscid, short-pilose.

= Branches pilose; the hairs spreading.

a. Racemes simple, or very slightly branched; verticels tending to become remote; the primary racemes becoming 0.8 to 2 dm. long: lowest bracts crenate-serrate.

19. S. RUBIGINOSA, Benth. l. c. 301. Mature leaves pubescent beneath only on the nerves. — Hemsl. l. c. 565; Briq. l. c. *S. lophantha*, Donnell Smith, Enum. Pl. Guat. ii. 62, not Benth. *S. Mocinoi*, Donnell Smith, l. c. iv. 125, 188, in part, not Benth. — Southern Mexico and Central America. GUATEMALA, Pinula, alt. 1,350 m., Feb., 1890 (*J. D. Smith*, no. 1911); Chiapas, Dept. Santa Rosa, alt. 1,080 m., Dec., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4400).

Var. **hebephylla.** Leaves velutinous beneath. — *S. lophantha*, Hemsl. l. c. 560, in part, not Benth. — VERA CRUZ, region of Orizaba, Oct. 11, 1866 (*Bourgeau*, no. 3215): CHIAPAS, among the mountains (*Ghiesbreght*, no. 745): GUATEMALA, Volcan Fuego, Zacatepéquez, alt. 1,540 m., March, 1892 (*J. D. Smith*, no. 2597).

b. Inflorescences paniculate; all the verticels remote: bracts entire.

20. **S. cladodes.** Stems glabrate below, sordid-pilose above: leaves oblong to narrow-ovate, 1 dm. or less long, 5 cm. or less wide, long-acuminate at tip, cuneate at base, finely crenate-serrate, short-velutinous or glabrate on both surfaces; petioles 2 cm. or less long: panicle with slender ascending densely pilose branches 1 to 2 dm. long: bracts purplish, broad-ovate or suborbicular, acuminate, more or less pilose, ciliate: verticels 1 to 2.5 cm. apart, 3–9-flowered; pedicels 4 to 7 mm. long, spreading and nodding at tips: calyx purplish, in anthesis 8 to 9 mm. long, broadened upward; the tube glandular-pilose; the glabrate limb with ovate-acuminate lobes: corolla-tube included; the lips one half longer than the calyx. — Northwestern Mexico. Without locality (*Seemann*): TEPIC, near Compostela, alt. 1,540 to 1,850 m., Apr. 7–8, 1897 (*E. W. Nelson*, no. 4171).

= = Branches canescent with appressed strongly recurved hairs: only the lowest verticels remote, the spiciform racemes 1 to 6 cm. long: bracts entire or undulate, ciliate.

21. **S. saltuensis.** Stems 1 to 1.5 m. high, bearing solitary terminal racemes or many inflorescences of 1 to 3 verticels on short leafy branchlets: leaves 6 cm. or less long, acute, finely crenate-serrate, dull green and finely pubescent above, canescent-tomentulose beneath, on slender petioles 1.5 cm. or less in length: bracts reniform, acuminate, brownish or slightly rosy tinged, minutely pubescent on the nerves, 1 to 1.5 cm. long: calyx purple-tinged, appressed-hirsute, in anthesis 7 mm. long, with broad blunt or short-acuminate lobes: corolla 1.3 cm. long, blue, the pilose galea one half as long as the lip. — MORELOS, in woods of Sierra de Tepoxtlan, alt. 2,310 m., Feb. 8, 1899 (*C. G. Pringle*, no. 8035): JALISCO, between San Sebastian and the summit of Mt. Bufa de Mascota, alt. 1,380 to 2,300 m., March 20, 1897 (*E. W. Nelson*, no. 4103).

= = = Of close affinity to the preceding is

22. S. BUPLEUROIDES, Presl in Benth. Lab. 271, a glabrous plant with fascicled peduncles each bearing solitary many-flowered verticels. Not identified.

* * Leaves broad-ovate (narrow-ovate in *S. nitida*) or rhombic-ovate, rounded to the subcordate truncate or subcuneate base.

← Verticels remote (approximate in a form of *S. hyptoides*): leaves 5 cm. or less in length.

↔ Leaves glabrous or only minutely puberulent.

= Leaves ovate-lanceolate, glossy.

23. S. NITIDA, Benth. in DC. l. c. 300; Hemsl. l. c. 562; Briq. l. c. *Hyptis nitida*, Mart. & Gal. Bull. Acad. Brux. xi. pt. 2, 189. — Described from OAXACA. Not seen.

= = Leaves rhombic-ovate, dull.

24. **S. galinsogifolia.** Stems 1.5 to 6 dm. high, branching, minutely puberulent, the young parts canescent: leaves 5 cm. or less in length, blunt or acutish, minutely and sparingly puberulent or glabrous, the lowest shorter than the slender petioles: peduncles 1.5 dm. or less in length; verticels from 1 to 5, the lowest becoming 3 to 5 cm. apart; rhachis canescent: bracts reniform, short acuminate, pale-brown or roseate-tinged, puberulent, ciliate-margined: calyx white-villous, with bluntish ovate-lanceolate lobes: corolla 8 to 9 mm. long, puberulent; the galea thrice exceeded by the lip. — *S. hyptoides*, Gray in Wats. Proc. Am. Acad. xxi. 435; Rose, Contrib. U. S. Nat. Herb. i. 110; not Mart. and Gal. — Northwestern Mexico. CHIHUAHUA, Hacienda San Miguel, 1885 (*Edw. Palmer*, no. 205): SONORA, in shade, mountain-cañon, Alamos, Sept., 1890 (*Edw. Palmer*, no. 682); Huehuerachi, alt. 1,230 m., Dec., 1890 (*C. V. Hartman*, no. 323, *F. E. Lloyd*, no. 452). Resembling *S. hyptoides*.

++ ++ Leaves setulose-hirsute.

= Calyx white-lanate, with short deltoid lobes.

25. S. LASIOCEPHALA, Hook. & Arn. Bot. Beech. 306; Benth. l. c.; Hemsl. l. c. 559; Briq. l. c. — TEPIC, Tepic (the type station), Feb., 1895 (*F. H. Lamb*, no. 621).

= = Calyx-tube hirsute; lobes lanceolate.

26. S. HYPTOIDES, Mart. & Gal. l.c. 74; Benth. l.c.; Hemsl. l.c. 558; Briq. l.c. *S. elsholtzioides*, Benth. Bot. Sulph. 152, t. 50. — Southern Mexico to Venezuela. JALISCO, bluffs of the Rio Grande de Santiago, near Guadalajara, Oct. 19, 1889 (*C. G. Pringle*, no. 2297): VERA CRUZ, Jalapa, alt. 1,230 to 1,390 m., 1894 (*C. L. Smith*, no. 1664): OAXACA, dry banks, Sierra de San Felipe, alt. 2,160 m., Oct. 11, 1894 (*C. G. Pringle*, no. 5624); Jayacatlan, alt. 1,320 m., Nov. 4, 1894 (*L. C. Smith*, no. 269); El Fortin, alt. 520 m., 1897 (*C. Conzatti* & *V. González*, no. 478): GUATEMALA, Coban, Dept. Alta Verapaz, alt. 1,320 m., March, 1886 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 299); Jumaytepeque, Dept. Santa Rosa, alt. 1,850 m., Sept., 1892 (*Heyde* & *Lux*, in exsicc. J. D. Smith, no. 4047: COSTA RICA, Volcan el Viejo (*Oersted*).

Var. **subspicata.** Plant simple, 1 to 2 dm. high: verticels 2 to 5,

approximate in a spiciform raceme 1 to 3.5 cm. long, or the lowest a little remote. — COSTA RICA, near San Francisco de Guadalupe, Jan. 4, 1893 (*Ad. Tonduz*, no. 7228).

+ + Verticels approximate in a spiciform raceme: principal leaves 6 to 8 cm. long.

27. **S. lophanthoides.** Stem tall, 1 m. or so high, glabrous, or minutely pilose at the tip; internodes 1 to 2 dm. long: leaves broad-ovate, short-acuminate, glabrous above, villous beneath on the nerves, and especially along the midrib, finely crenate-serrate, on slender petioles 3 cm. or less in length: peduncles 1.5 cm. or less long; racemes dense, the primary ones 1.3 dm. or less in length, 1.5 cm. thick: bracts brownish, ciliate-margined: calyx viscid, pilose on the strong nerves, in anthesis 5 to 6 mm. long, slightly enlarged at the throat, with broad-deltoid subulate-tipped lobes: corolla blue, slightly viscid, 1.2 to 1.4 cm. long, the lip twice exceeding the galea. — OAXACA, mountains near Tlapancingo, alt. 1,850 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, no. 2086).

§ 3. BRACHYANTHAE, Benth. Bracts small, after anthesis falling away, rarely persisting. Corolla middle-sized, conspicuously exceeding the calyx, 1 to barely 2 cm. long (rarely longer), generally blue, very rarely white flesh colored or crimson, never scarlet, with the tube generally ventricose and often contracted at the throat; with straight or scarcely arched galea (upper lip), and broader 3-lobed lower lip generally exceeding the galea, the middle lobe broadest and emarginate. (Species with exceptionally large flowers, but with their affinities here are *S. heterotricha*, *S. flaccida*, *S. cedrosensis*, *S. semiatrata*, and *S. sidaefolia* with corollas fully 2 cm. long; *S. angustifolia* with corolla 2.5 cm. long; and *S. sessilifolia* with corolla 3 cm. long.)

A. Angustifoliae, Benth. Leafy-stemmed herbs or half-shrubs with slightly branching stems: leaves linear, lanceolate, or narrowly ovate-elliptic, narrowed cuneate or rounded-truncate at base.

* Bracts orbicular, acuminate, about equalling the calyx, persistent: verticels becoming remote: calyx campanulate, green, strongly nerved, subinflated, becoming 1 cm. long, the broad upper lip suberect. Erect annual 2 to 4 dm. high.

28. S. HIRSUTA, Jacq. Hort. Schoenb. iii. 1, t. 252; Benth. in DC. Prodr. xii. 301; Hemsl. l. c. 557; Briq. in Engl. & Prantl, l. c. 278. *S. phlomoides*, Cav. Ic. iv. 10, t. 320. *S. ciliata*, Poir. Dict. vi. 588. *S. bracteata*, Poir. l. c. 622. *S. sideritidis*, Vahl, Enum. i. 250. *S. cryptanthos*, Schultes, Obs. 12, acc. to Benth. *S. nepetifolia*, Poir. Suppl. v. 48. *S. ciliaris*, Sessé & Moc. Pl. Nueva España, ed. 2, 7. —

Central Mexico. DURANGO, infrequent on shady slopes of ravines, Santiago Papasquiaro, Aug., 1896 (*Edw. Palmer*, no. 451): SAN LUIS POTOSI, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 736): MEXICO, barranca near Santa Fé, July 6, 1865–66 (*Bourgeau*, no. 490); Santa Fé, Sept. 3, 1899 (*C. G. Pringle*, no. 7991).

* * Bracts less conspicuous, soon deciduous: calyx campanulate, conspicuously bilabiate, subinflated.

+ Leaves sessile or subsessile or narrowed to short inconspicuous petioles: racemes elongated, at least the lower verticels becoming remote: perennials. (*S. assurgens* may be looked for here.)

++ Stems leafy nearly or quite to the inflorescence.

= Without glandular hairs on stem and calyx.

29. S. ANGUSTIFOLIA, Cav. Stems hispid, bearded at the nodes, 2 to 7 dm. high, very leafy: leaves mostly hispid on the margins and nerves — Ic. iv. 9, t. 317; Lindley, Bot. Reg. xviii. t. 1554; Sweet, Brit. Fl. Gard. n. s. iii. t. 219; Benth. l. c. 301; Hemsl. l. c. 552; Gray, Syn. Fl. N. A. ii. 369; Briq. l. c. *S. reptans*, Jacq. Hort. Schoen. iii. 38, t. 319. *S. virgata*, Ort. Dec. i. 3. — Central and Southern Mexico. ZACATECAS, near Plateado, Sept. 2, 1897 (*J. N. Rose*, no. 2745): JALISCO, Valley of Mexico, Tizapan, June 26, 1865–66 (*Bourgeau*, no. 125, in part): MICHOACAN, Tlalpujahua 1828 (*Graham*); plains near Patzcuaro, Aug. 7, 1892 (*C. G. Pringle*, no. 4163). *S. linifolia*, Mart. & Gal. l. c. 70, and Benth. l. c. 302, from MICHOACAN is probably only a form with rose-colored corolla.

Var. GLABRA, Gray, l. c. Stems and leaves glabrous. — *S. leptophylla*, Benth. Lab. 249, & in DC. l. c. 299. *S. azurea*, Torr. Bot. Mex. Bound. 131, in part. — From Texas through central and southern Mexico, of broader range than the hispid type. SAN LUIS POTOSI, in sand near the city of San Luis Potosi, 1876 (*Schaffner*, no. 672): AGUAS CALIENTES (*Hartweg*, no. 163); JALISCO, edge of swamp, Guadalajara, July, 1886 (*Edw. Palmer*, no. 226): CHIAPAS, without locality, 1864–70 (*Ghiesbreght*, no. 751); valley of Jiquipilas, alt. 650–1,100 m., Aug. 16, 1895 (*E. W. Nelson*, no. 2922).

= = Glandular-hairy.

30. **S. heterotricha.** Stems erect from a rather woody base, 2.5 to 4.5 dm. high, puberulent, and, especially above, bearing slender jointed glandular hairs: leaves linear-attenuate, strongly 1–3-nerved, 3 to 8 cm. long, puberulent or glabrate or rarely with some slender glandular hairs: raceme 2 cm. or less in length; verticels all remote, the lower 3 to 4 cm. apart, 3–9-flowered: bracts lanceolate to ovate-lanceolate, glandular-

ciliate, mostly shorter than the calyx: pedicels 2 to 4 mm. long: calyx tubular-campanulate, in anthesis 8 to 10 mm. long, glandular-ciliate on the strong nerves; lobes about 3 mm. long; the upper lip broadly ovate, bluntish, entire; lower lip with 2 slightly narrower and more pointed lobes: corolla blue or violet as in *S. angustifolia*, but the galea more pubescent: style bearded. — *S. angustifolia*, Gray in Wats. Proc. Am. Acad. xx. 445, in part, not Cav. — JALISCO, in bottoms, Rio Blanco, June, 1866 (*Edw. Palmer*, no. 53); plains near Guadalajara, July 1, 1889 (*C. G. Pringle*, no. 2913).

Var. **multinervia.** Leaves lance-linear to oblanceolate, mostly with 5 parallel nerves. — TEPIC, foothills between Acaponeta and Pedro Paulo, Aug. 2, 1897 (*J. N. Rose*, no. 1934).

++ ++ Raceme long-pedunculate: leaves confined to the lower half of the plant.

= Upper lobe of the calyx tridentate.

a. Calyx-tube pilose-hispid, not glandular: attenuate bracts glabrous or glabrate.

31. S. COMOSA, Peyr. Stem 2 to 6 dm. high, glabrous or glandular-pilose: leaves membranaceous, linear or lanceolate, the upper half crenate-serrate, generally pubescent beneath on the veins. — Linnaea, xxx. 32; Hemsl. l. c. 555. *S. glechomaefolia*, Wats. Proc. Am. Acad. xviii. 137, in part, not HBK. — Central and southeastern Mexico. Without locality (*Coulter*, no. 1115): SAN LUIS POTOSI, without locality, 1878 (*Parry & Palmer*, no. 761): MEXICO, Santa Fé, July 6, 1865–66 (*Bourgeau*, n. 396): VERA CRUZ, Mt. Orizaba, alt. 2,460 to 2,770 m., Aug., 1891 (*Seaton*, nos. 259, 323). Originally described from Toluca, MEXICO.

Var. **hypoglauca.** Similar, glabrous: leaves slightly petioled, very glabrous, glaucous beneath, entire or serrulate at tip. — *S. hypoglauca*, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 136. — MICHOACAN, mountains about Patzcuaro, July 30, 1892 (*C. G. Pringle*, no. 4155). A glabrous and glaucous extreme, not separable otherwise from *S. comosa*.

b. Calyx and attenuate bracts glandular-hispid.

1. Leaves linear, revolute, with one conspicuous broad nerve.

32. **S. unicostata.** Slender, 2 to 4 dm. high: stem sparingly glandular-hispid: leaves 3 to 6 cm. long, 2 mm. or less wide, glabrous: peduncles 0.5 to 1 dm. long; raceme 1 to 1.5 dm. long, the lower verticels 0.5 dm. apart, the upper approximate; verticels 3–6-flowered: bracts short, ovate, subulate-tipped: calyx in anthesis 5 mm. long, the tube equalling the lance-subulate lobes: corolla 1.3 cm. long, puberulent. —

S. angustifolia, var. *glabra*, Wats. Proc. Am. Acad. xviii. 138, in part, not Gray. — San Luis Potosi, without locality, alt. 1,840 to 2,460 m., 1878 (*Parry & Palmer*, no. 760).

2. Leaves oblanceolate, pinnately nerved.

33. **S. firma.** Stems decumbent at base, glabrous below, glandular-pubescent in the inflorescence, 4 to 5 dm. high: leaves 4 to 8 cm. long, 0.5 to 2 cm. broad, acute or blunt at tip, cuneate at base, crenulate-serrate, thick and firm, glabrous, above sublucid: peduncles elongated, 1–2-bracteate; racemes becoming 3 dm. long; verticels all distinct, 3–6-flowered, the lowermost 5 to 8 cm. apart: bracts short, broad-ovate, subulate-tipped: pedicels short: calyx campanulate, in anthesis 5 to 6 mm., becoming 1 cm. long; tube twice exceeding the lobes; upper lip broad-ovate, the teeth subulate; lobes of the lower lip with long subulate tips: corolla 1.5 cm. long, the tube slightly exserted, the dark blue lower lip with a pale spot in its centre and twice exceeding the puberulent blunt galea: style bearded. — *S. glechomaefolia*, Wats. l. c. not HBK. — Jalisco, on hillsides, Rio Blanco, June, 1886 (*Edw. Palmer*, no. 61).

= = Upper lip of calyx entire.

a. Glabrous: leaves oblong-lanceolate: bracts round, obtuse or short-mucronate.

34. S. laevis, Benth. Lab. 251, & in DC. l. c. 303; Hemsl. l. c. 559; Briq. l. c. & in Engl. & Prantl, l. c. — Not seen. Described from Mexico and from near Tlalpujahua, Michoacan.

b. Pubescent: leaves elliptic-oblanceolate or narrowly obovate: bracts ovate, long-attenuate.

35. **S. sinaloensis.** Stems slender, 2 to 2.5 dm. high, slightly branched, below short- hirsute, above and in the inflorescence densely pubescent with long straight fine viscid hairs: leaves acutish, the upper half appressed-serrate, the lower half subentire, subcuneate to a sessile base or obscurely short-petioled; those of the main stem 3 to 4 pairs, the uppermost largest, 3.5 to 6 cm. long, 1.25 to 2 cm. broad, above appressed short-setulose or glabrate, beneath pale, minutely setulose on the nerves: peduncle 6 to 9 cm. long, about equalling the leafy lower portion of the plant; raceme becoming 1 dm. or so long; verticels 3–6-flowered, the lower 4 cm. apart, the upper rather approximate: bracts pilose-hispid, colored, soon deciduous: calyx densely pilose-hispid with fine viscid hairs, in anthesis 5 to 7 mm. long; the tube twice as long as the broad abruptly subulate-tipped lobes: corolla 1.5 cm. long, the tube slightly exserted, the dark blue lip with a pale spot in its centre twice exceeding the puberu-

lent blunt oblong galea: style bearded. — SINALOA, foothills of the Sierra Madre near Colomas, July 14, 1897 (*J. N. Rose*, no. 1727).

+ + Leaves nearly all with definite petioles. (*S. comosa* and *S. sinaloensis* may be looked for here.)

++ Annuals, more or less bushy-branched: racemes elongated, at least the lower verticels remote.

= Leaves linear-lanceolate to oblong-linear, obscurely serrate: bracts lanceolate.

36. S. LANCEOLATA, Brouss. App. Elench. Pl. Hort. Monsp. (1805) 15; Willd. Enum. Hort. Berol. i. 37; Jacq.f. Eclog. i. 22, t. 13; Benth. l. c. 299; Gray, l. c. 369; Hemsl. l. c.; Briq. l. c. *S. reflexa*, Horn. Hort. Hafn. (1807), i. 34. *S. lanceifolia*, Poir. Suppl. v. 49. *S. aspidophylla*, R. & S. Syst. Mant. i. 206. *S. trichostemoides*, Pursh, Fl. i. 19. *S. aegyptiaca*, Sessé & Moc. l. c. 6, not L. — Florida and S. W. United States to Central Mexico. Without locality, 1848–49 (*Gregg*, no. 541): CHIHUAHUA, low ground near Chihuahua, Oct. 1852 (*Geo. Thurber*, no. 821); plains near Chihuahua, Sept. 11, 1885 (*C. G. Pringle*, no. 654); damp places near Pilares, Sept. 23, 1891 (*C. V. Hartman*, no. 744): COAHUILA, abundant in abandoned fields and bottom-lands, Saltillo, Sept., 1898 (*Edw. Palmer*, no. 336): DURANGO, abundant in rich bottom-lands, near Durango, July, 1896 (*Edw. Palmer*, no. 327); along arroyos, Santiago Papasquiaro, Aug., 1896 (*Edw. Palmer*, no. 446); between Cerro Prieto and La Providencia, Sept. 11, 1898 (*E. W. Nelson*, 4969): SAN LUIS POTOSI, damp places about the city, 1876 (*Schaffner*, no. 673); alt. 1,840 to 2,460 m., 1878 (*Parry & Palmer*, no. 744): GUANAJUATO, Presa de la olla, 1893 (*A. Dugès*): QUERETARO, Nov. 19, 1827 (*Berlandier*, no. 1279).

= = Leaves lanceolate or oblong-lanceolate, coarsely subincised-dentate: bracts broadly ovate.

37. S. SUBINCISA, Benth. Pl. Hartw. 20, & in DC. l. c. 303; Gray, l. c.; Hemsl. l. c. 565; Briq. l. c. — Texas to Central Mexico. CHIHUAHUA, Pilares, Sept. 18, 1891 (*C. V. Hartman*, no. 776): DURANGO, rich low ground near Durango, July, 1896 (*Edw. Palmer*, no. 305): AGUAS CALIENTES, in fields near the city (*Hartweg*, no. 160). Originally described from Hartweg's plant.

= = = Leaves ovate or narrowly rhombic-ovate, crenate-serrate: bracts narrowly ovate with long attenuate barbulate tips.

38. **S. Chia.** Similar to the two preceding: about 6 dm. high, with long internodes (the lower 5 to 7 cm. long): stem strongly quadrangular, puberulent with appressed white hairs, densely white-pilose at the nodes:

leaves bluntish at tip, cuneate at base to a long slender petiole, coarsely crenate-serrate, especially above the subentire base; margin and petiole densely short-pilose; upper face dark green, puberulent or glabrate; lower face paler, minutely pubescent: racemes very short-pedunculate, 0.5 to 2 dm. long; verticels 3–6-flowered, the lower 1.5 cm. apart, the upper approximate: pedicels 3 mm. long, minutely white-pilose: calyx ciliate on the strong nerves, narrowly campanulate, in anthesis 8 mm. long; the tube twice exceeding the ovate acuminate lobes; upper lip entire: corolla 1.3 to 1.5 cm. long, the white tube somewhat exserted; lips blue, the lower pubescent beneath, twice as long as the pubescent upper one: style glabrous. — COAHUILA, damp bottom-lands, Saltillo, Sept., 1898 (*Edw. Palmer*, no. 334). This as well as three other species, *S. lanceolata*, *S. tiliaefolia*, and *S. hispanica*, are called *chia* by the Mexicans, and a cooling beverage known likewise by that name is prepared from the seed. (See Rose, Contr. U. S. Nat. Herb. v. 225.)

++ ++ Perennials, mostly decumbent at least at base.

= The lower verticels becoming remote.

a. **Corolla white or pale: stem strongly decumbent or subrepent: leaves ovate-elliptic to oblong, glabrate: peduncle 0.5 to 1.5 dm. long.**

39. S. ASSURGENS, HBK. Nov. Gen. & Spec. ii. 293; Benth. l. c. 304; Hemsl. l. c. 553; Briq. l. c. — MICHOACAN, grassy hills near Patzcuaro, July 18, 1892 (*C. G. Pringle*, no. 4150); Oct. 20, 1898 (*E. W. D. Holway*, no. 3184); originally collected near the same town, alt. 2,100 m., by Humboldt & Bonpland. According to Kunth the color of the corollae is "pallide violacea? (carnea ex Bonpl.)," but neither of the recently collected specimens shows any violet tinge.

b. **Corolla blue or violet.**

1. **Pilose-hirsute: internodes short: leaves oblong to rhombic-ovate: calyx hispid below, in anthesis 5 to 7 mm. long; tube equalling the lobes; upper lip tridentate or entire.**

40. S. PRUNELLOIDES, HBK. l. c. 289; Benth. l. c. 305; Hemsley, l. c. 563; Briq. l. c. *S. glechomaefolia*, Wats. Proc. Am. Acad. xviii. 137, not HBK. *S. tricandra*, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 133. — Coahuila to Oaxaca. COAHUILA, mountains 64 km. south of Saltillo, July, 1880 (*Edw. Palmer*, no. 1098); limestone hills, Carneros Pass, Sept. 27, 1890 (*C. G. Pringle*, no. 3681): NUEVO LEON, Lerios, July, 1880 (*Edw. Palmer*, no. 1097): DURANGO, Cacaria, Aug. 5, 1898 *E. W. Nelson*, no. 4651): MEXICO, without locality, 1848–49 (*Gregg*, no. 406); cool slopes, Sierra de las Cruces, Aug. 21, 1892 (*C. G. Prin-*

gle, no. 4200): OAXACA, Cuilapan, alt. 1,840 m., June 27, 1895 (*L. C. Smith*, no. 778). Originally from Volcan de Jorullo, MICHOACAN. Briquet bases his species *S. trichandra* upon Pringle's no. 4200, stating in his description of the calyx that the upper lip is entire. In the specimens of this number, as represented in the Gray Herbarium, the upper lip is usually tridentate, thus placing the plant distinctly with *S. prunelloides*.

2. Puberulent: internodes longer: leaves oblong or narrowly ovate-oblong: calyx puberulent, tubular-campanulate, in anthesis 7 to 8 mm. long, the tube one half longer than the lobes; upper lip entire.

41. S. OBLONGIFOLIA, Mart. & Gal. l. c. 79; Benth. l. c.; Hemsl. l. c. 562; Briq. in Engl. & Prantl, l. c. *S. reticulata*, Mart. & Gal. l. c. 64, acc. to Benth. — Southern Mexico. CHIAPAS, without locality, July, Aug., 1864–70 (*Ghiesbreght*, nos. 61, 750); near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895 (*E. W. Nelson*, no. 3191). Originally described from OAXACA.

= = Verticels congested in a long-peduncled head: stem pilose-hispid, 2 to 2.5 dm. high: leaves ovate-elliptic or ovate-oblong, obtuse: heads 1 to 1.5 cm. high.

42. S. TATEI, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 135. — Mexico, without indicated locality in herb. Delessert. Not seen.

* * * Bracts deciduous: calyx cylindric, not becoming inflated, less conspicuously bilabiate: stems numerous from a woody base.

+ Bracts very early deciduous: calyx blue-tinged, conspicuously nerved, puberulent or short-pubescent.

++ Verticels, or all but the lowermost, aggregated, forming a rather dense head.

= Stems 1 m. or less high, finely canescent: leaves 2 to 8 cm. long, soft-canescent beneath: heads simple or branched, 2 to 12 cm. long: calyx, in anthesis, 5 to 7 mm. long; the tube thrice exceeding the deltoid subulate-acuminate lobes: corolla blue rose or white.

43. S. LAVENDULOIDES, HBK. Leaves lanceolate, oblanceolate, or oblong-lanceolate, acutish or blunt, crenulate. — Nov. Gen. & Spec. ii. 287; Benth. l. c. 303; Hemsl. l. c. 559; Briq. l. c. *S. Humboldtiana*, R. & S. Syst. Mant. i. 183. *S. lavendulaefolia*, Spreng. Syst. i. 58, not Vahl. *S. purpurina*, La Llave, La Nat. vii. 82. *S. stricta*, Sessé & Moc. l. c. 8. — Southern Mexico and Central America. MEXICO, Valley of Mexico (*Bourgeau*, no. 1110, *Schaffner*, no. 410): MICHOACAN, hills of Patzcuaro, Nov. 21, 1891 (*C. G. Pringle*, no. 3954): MORELOS, Cuernavaca, alt. 2,300 m., Jan. 4, 1899 (*C. C. Deam*, no. 2): OAXACA, N. W. slope of Mt. Zempoaltepec, alt. 2,460 to 3,000 m.. July 10, 1894 (*E. W. Nelson*, no. 701): Cuyamecalco, alt. 2,000 m., Sept. 4, 1895 (*L. C. Smith*,

no. 601): CHIAPAS, without locality, 1864–70 (*Ghiesbreght*, nos. 738, 741, 747); near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895 (*E. W. Nelson*, no. 3142): GUATEMALA, Santa Rosa, Depart. Baja Verapaz, alt. 1,530 m., April, 1887 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 1193); Santiago, Depart. Zacatepéquez, alt. 2,000 m., 1891 (*Rosalío Gómez* in exsicc. J. D. Smith, no. 823); Sacabajá, Depart. Quiché, alt. 1,230 m., March, 1892, and Castillas, Depart. Santa Rosa, alt. 1,230 m., Dec., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, nos. 3128, 4395). Originally described from Patzcuaro, MICHOACAN.

Var. LATIFOLIA, Benth. Leaves elliptic-oblong, acute. — Pl. Hartw. 21, & in DC. l. c. — JALISCO, Bolaños (*Hartweg*, no. 171).

= = Similar: stems minutely retrorse-pubescent: leaves not canescent beneath.

a. Leaves oblong or narrowly ovate-elliptic, 1.5 to 3 cm. long, thickish, rugose, green, sometimes a little pubescent on the nerves beneath, obscurely crenate or entire: lower verticels a little remote: calyx 5 to 6 mm. long the upper lip very short, the lower with 2 ovate lobes 1 mm. long.

44. S. GUADALAJARENSIS, Briq. Ann. Conserv. Jard. Bot. Genève ii. 132. *S. helianthemifolia*, var., Gray in Wats. Proc. Am. Acad. xxii. 445, not *S. helianthemifolia*, Benth. — JALISCO, among rocks, Rio Blanco, Sept., 1886 (*Edw. Palmer*, no. 556); dry rocky hills near Guadalajara, Nov. 1, 1893 (*C. G. Pringle*, no. 4624).

b. Leaves lanceolate or oblong-linear, bluntish, dull, minutely puberulent or glabrate: deltoid acuminate calyx-lobes subequal.

1. Stems numerous, assurgent, 2 to 2.5 dm. high, leafy chiefly near the base: leaves entire, glaucous: calyx white-puberulent, in anthesis 6 mm. long.

45. **S. Teresae.** Leaves short-petioled, 2 to 2.5 cm. long, 0.25 to 0.5 cm. broad: peduncles 1 to 1.5 dm. long; raceme rather loosely flowered; the lower verticels 1 cm. apart, 2–6-flowered: bracts ovate-lanceolate, acuminate: calyx dark blue: corolla 1.3 cm. long, the galea densely pubescent. — TEPIC, near Santa Teresa, top of Sierra Madre, Aug. 13, 1897 (*J. N. Rose*, no. 2233).

2. Stems few, erect, 6 to 8 dm. high: leaves remote, serrate, not glaucous: calyx minutely pubescent, not whitened, in anthesis 4 to 5 mm. long.

46. **S. muscarioides.** Stems simple or sparingly branched; internodes 1 dm. or less long; leaves short-petioled, 5 to 6 cm. long, 0.75 to 1.5 cm. wide: peduncles 2 dm. or less long: bracts minute, caducous: lower verticels 2 or 3 cm. apart, the others crowded, 8–20-flowered: pedicels spreading and drooping: calyx dark blue and green: corolla 1.2 cm. long; the lower lip much exceeding the pubescent galea: style slightly exserted, bearded. — Northwestern Mexico. CHIHUAHUA, base

of Mt. Mohinora, 13 km. from Guadalupe y Calvo, alt. 2,150 to 2,310 m., Aug., 1898 (*E. W. Nelson*, no. 4850). Inflorescence, as also that of related species, suggesting *Muscari botryodes*.

++ ++ Verticels mostly remote, forming an elongate loose raceme.

= Stem 5 to 6 dm. high: leaves oblong, blunt or acutish: racemes 2.5 dm. long or less; verticels 6–20-flowered, lower 4 to 5 cm. apart, upper approximate: calyces reflexed: corolla 1 cm. long, the tube included or short-exserted.

47. S. HELIANTHEMIFOLIA, Benth. Lab. 254, & in DC. l. c. 304; Hemsl. l. c. 557; Briq. in Engl. & Prantl, l. c. — South-central Mexico. SAN LUIS POTOSI, alt. 1,840 m., 1878 (*Parry & Palmer*, no. 729): HIDALGO, Sierra de Pachuca, alt. 3,000 m., Sept. 14, 1899 (*C. G. Pringle*, no. 8222): MICHOACAN, near Tlalpujahua (*Graham*). Described from Graham's material from Tlalpujahua and from San Martin, PUEBLA.

= = Similar: leaves oblong-lanceolate, acute, serrate: verticels subequally remote: calyces less reflexed: corolla-tube equalling the calyx.

48. S. REMOTA, Benth. l. c.; Hemsl. l. c. 564; Briq. l. c. Described from Mexico without definite locality.

+ + Bracts hardly persistent, lower verticels becoming slightly remote: nerves of calyx hidden by the long appressed silky pubescence.

49. **S. cryptodonta.** Resembling *S. lavenduloides*: stems canescent: leaves narrow-oblong, bluut, crenate-serrate, 2 to 5 cm. long, 0.5 to 1.5 cm. wide, rugose, green and appressed-setulose above, white-tomentose beneath, short-petioled: raceme 2 to 5 cm. long; bracts ovate-lanceolate, acuminate, ascending: calyx blue, in anthesis 5 mm. long, the short teeth obscured by the dense silky hairs: corolla 1 cm. long. the tube barely exserted; galea pilose, half as long as the lip. — DURANGO, Aug. 16, 1897 (*J. N. Rose*, no. 2338).

+ + + Bracts persistent through anthesis, their slender tips conspicuous: nerves of calyx somewhat hidden by long hairs: heads very dense.

= Leaves lanceolate, slightly canescent: the long-peduncled heads 3 to 5 cm. in length: bracts ascending: calyx white-villous.

50. S. STACHYOIDES, HBK. l. c. t. 138; Benth. l. c. 303; Hemsl. l. c. 565; Briq. l. c. — Southern Mexico. OAXACA, 29 km. S. W. of the city of Oaxaca, alt. 2,300 to 2,920 m., Sept., 1894 (*E. W. Nelson*, no. 1387). Originally from Los Joares and Santa Rosa.

= = Leaves oblong, glabrous or slightly puberulent: heads 2 to 13 cm. long: bracts more spreading: calyx pilose-hirsute.

51. S. ELONGATA, HBK. l. c. t. 139; Benth. l. c.; Hemsl. l. c. 556. *S. Betonica*, R. & S. l. c. 188. *S. simplex*, Spreng. Syst. i. 58. — South-

central Mexico. MEXICO, Valley of Mexico, Sept. 7, 1865–66 (*Bourgeau*, no. 859); wooded cañons, Sierra de las Cruces, Oct. 2, 1892, and Serrania de Ajusco, alt. 3,075 m., Sept. 11, 1897 (*C. G. Pringle*, nos. 4278, 7457). Originally from the region of Ario, MICHOACAN.

B. Acaulae. Similar to *Angustifoliae* but tending to be acaulescent or subacaulescent, the obovate canescent basal leaves forming a rosette: peduncle 0.5 to 2.5 dm. high; raceme as long; the verticels remote.

52. S. NANA, HBK. l. c. 289; Benth. in DC. l. c. 304; Hemsl. l. c. 561; Briq. l. c. *S. prunelloides*, Benth. Pl. Hartw. 90, 351, not HBK. *S. rhombifolia*, Sessé & Moc. l. c. 8. — Northern Mexico to Central America. DURANGO, El Salto, July 12, 1898 (*E. W. Nelson*, no. 4566): ZACATECAS, near San Juan Capistrano, Aug. 18, 1897 (*J. N. Rose*, no. 3534): SAN LUIS POTOSI, rare in the mountains, San Rafael, 1876 (*Schaffner*, no. 680); alt. 1,840 m. (*Parry & Palmer*, no. 745, 746): GUANAJUATO, 1893 (*A. Dugès*, no. 228 B): OAXACA, Boca de Leon, Telixtlahuaca, June 27, 1895 (*L. C. Smith*, no. 414). Originally from GUANAJUATO.

C. Vulgares, Benth. Branching or sometimes simple herbs, rarely half-shrubs: leaves petioled, ovate, rarely oblong, membranaceous, rounded round-cuneate or subcordate at base. (*S. prunelloides* and *S. Martensii* may be looked for here.)

* Annuals.

← Coarse more or less canescent plant with long-petioled pale-green leaves and peduncled spiciform heads with persistent foliaceous broad bracts.

53. S. HISPANICA, L. Spec. 25; Edw. Bot. Reg. v. t. 359; Benth. in DC. l. c. 308; Hemsl. l. c. 558; Briq. in Engl. & Prantl, l. c. 279. *S. tetragona*, Moench, Meth. 373. *S. prismatica*, Cav. fide Hemsl. l. c. *S. neo-hispanica*, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 137. — From western Texas and Coahuila to northern South America and the West Indies. Introduced into southern Europe, whence the specific name. COAHUILA, Carneros Pass, Sept. 27, 1890 (*C. G. Pringle*, no. 3683): DURANGO, sides of arroyos, Santiago Papasquiaro, Aug., 1896 (*Edw. Palmer*, no. 967); bottom-lands, Durango, Oct., 1896 (*Edw. Palmer*, no. 757): SAN LUIS POTOSI, sand near the city, 1876 (*Schaffner*, nos. 675, 1053): GUANAJUATO, 1895 (*A. Dugès*): JALISCO, Rio Blanco, Oct., 1886 (*Edw. Palmer*, no. 659): VERA CRUZ, Orizaba (*Botteri*, no. 534): MEXICO, Santa Fé, Oct. 15, 1865–66 (*Bourgeau*, no. 1109): OAXACA, near Reyes, alt. 1,800 to 2,600 m., Oct. 20, 1894 (*E. W. Nelson*, no. 1782); Jayacatlan, alt. 1,350 m., Nov. 4, 1894

(*L. C. Smith*, no. 268): GUATEMALA, Buena Vista, Depart. Santa Rosa, alt. 1,700 m., Dec., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4401). Frequently cultivated in Mexico as "Chia-blanco" — see note under *S. Chia* above.

+ + Delicate, not canescent: leaves short-petioled: bracts small, deciduous.

54. **S. flaccida.** Slender, 2 to 3 dm. high, simple or branching from the base, puberulent below, more or less glandular-pilose above: leaves very thin and flaccid, glabrous and lucid or minutely hispidulous on the nerves beneath, from rhombic-ovate to oblong-ovate, short-acuminate, coarsely appressed-serrate, cuneate and entire at base, the uppermost largest, 4 to 6 cm. long, 2 to 3.5 cm. broad; petioles slender, puberulent, 0.5 to 1.5 cm. long: peduncle 4 to 5 cm. long; raceme short, 2 to 3 cm. long, of 2 or 3 remote 3–6-flowered verticels: bracts lanceolate: pedicels 3 mm. long: calyx minutely glandular-hispidulous, narrow-campanulate, in anthesis nearly 1 cm. long; the upper lip bluish, entire, ovate, bluntly mucronate; the lower lip paler, with 2 lance-attenuate lobes: corolla 2 to 2.5 cm. long, the white tube one half longer than the calyx, hardly ventricose; galea blue, puberulent, one half as long as the broad white lip. — Southern Mexico and adjacent Central America. CHIAPAS, between Tumbala and El Salto, alt. 460 to 1,380 m., Oct. 29, 1895 (*E. W. Nelson*, no. 3374): GUATEMALA, in woods, Rubeleruz, Depart. Alta Verapaz, alt. 770 m., Oct., 1885 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 780).

* * Perennials.

+ Erect or suberect, branching mostly above the base, leafy nearly or quite to the inflorescence.

++ Leaves rounded rounded-truncate or subcordate at base, not tapering to the distinct petioles.

= Calyx in anthesis about 3 mm. long.

a. Racemes terminal and from the upper axils, panicled, and often branching: leaves pale green, glaucous beneath: calyx minutely puberulent, with very short broad-deltoid teeth.

1. Racemes 2 to 7 cm. long, compactly flowered: pedicels 1 mm. long.

55. **S. BREVICALYX**, Benth. in DC. l. c. 309; Hemsl. l. c. 553. — Southern Mexico. GUERRERO, between Ayuainapa and Petatlan, alt. 1,530 to 2,150 m. Dec. 14, 1894, and at top of Sierra Madre near Chilpancingo, alt. 2,770 to 3,140 m., Dec. 24, 1894 (*E. W. Nelson*, nos. 2146, 2220): OAXACA, mountains near Tlapancingo, alt. 1,840 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, no. 2064). Originally from OAXACA.

2. Racemes longer, slender: pedicels 2 to 3 mm. long, equalling the calyx.

56. S. FILIPES, Benth. l. c.; Hemsl. l. c. 556. *S. polystachya*, var., Benth. Pl. Hartw. 50, not *S. polystachya*, Ort. Described from Regla. Not seen.

b. Racemes short, simple, solitary, or paniculate, with some remote lower verticels in the axils of the upper foliar leaves: calyx hispidulous, with short deltoid-subulate teeth.

57. S. menthiformis. Tall herb, 6 to 8 dm. high: stems strongly angular and furrowed, cinereous-puberulent, freely branching: leaves ovate or orbicular-ovate, acuminate, round-cordate at base, crenulate-serrate, 1.5 to 5 cm. long, 1 to 3.5 cm. broad, dark green and glabrate above, pale and minutely puberulent or glabrate beneath, on slender cinereous-puberulent petioles 1 to 2 cm. long; raceme, excluding the remote axillary verticels, 2 to 5 cm. long; the crowded verticels 6–20-flowered: pedicels barely 1 mm. long: corolla blue, pilose, 1.2 cm. long; the tube twice exceeding the calyx; the lip hardly equalling the galea: style glabrous or slightly bearded. — *S. polystachya*, Donnell Smith, Enum. Pl. Guat. iv. 126, not Ort. *S. purpurea*, Donnell Smith, l. c. in part, not Cav. — COSTA RICA, Cartago, alt. 1,300 m., Oct., 1887 (*Juan J. Cooper* in exsicc. J. D. Smith, no. 5902); San Francisco de Guadalupe, alt. 1,200 m., Jan., 1894 (*A. Tonduz*, no. 1781); Rio Turrialba, Prov. Cartago, alt. 500 m., March, 1894 (*J. D. Smith*, no. 4919). Habitally resembling forms of *Mentha aquatica*.

c. Racemes simple, with no axillary lower verticels.

1. Raceme spiciform, densely flowered, 4 to 10 cm. long: leaves broad-ovate, 1 dm. long, 6 dm. wide, on long petioles: corolla white.

58. S. CATARIA, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 142. Described from COSTA RICA. No specimen seen.

2. Raceme elongate, loosely-flowered, at least the lower verticels remote.

○ Leaves broad-ovate, glabrous, coarsely and irregularly serrate: pedicels 2 to 4 mm. long.

59. S. BRACHYODONTA, Briq. l. c. 149. *S. albiflora*, var. *caerulescens*, Gray in Wats. Proc. Am. Acad. xxii. 445, in part. — JALISCO, on sides of cañons, Rio Blanco, Sept., 1886 (*Edw. Palmer*, no. 598); hillsides near Guadalajara, Sept. 27, 1889 (*C. G. Pringle*, no. 2463). Placed by Briquet under the group *Cordifoliae*, Benth., but the leaves are rounded-truncate at base, not cordate, and in habit as well the plant much more resembles members of the *Vulgares*.

○ ○ Leaves narrow-ovate, lanate beneath in the axils of the nerves, finely and regularly serrate: pedicels 1 mm. long.

60. **S. Ghiesbreghtii.** Tall, 1 m. (?) or less high: stems puberulent, with long ascending branches: leaves long-acuminate, rounded at base, 3 to 6 cm. long, 1 to 3 cm. wide, puberulent above, pilose or glabrate beneath, except for the often densely lanate mid-nerve, on petioles 1 cm. or less in length: racemes slender, flexuous, 1 to 2.5 dm. long; verticels 10–20-flowered, the lower 1.5 cm. apart: bracts small, ovate-attenuate, caducous: calyx hispid, with short-deltoid ciliate subulate-tipped teeth: corolla pale blue, pilose, 1.2 cm. long; the ventricose tube twice exceeding the calyx; galea and lip subequal: style bearded. — *S. polystachya*, Hemsl. l. c. 563, in part, not Ort. — CHIAPAS, among the mountains, July, 1864–70 (*Ghiesbreght*, nos. 129, 743).

= = Calyx in anthesis about 5 mm. long.

a. Lower surfaces of firm leaves the pedicels and the calyces permanently canescent with fine stellate pubescence.

61. S. PALMERI, Gray, Proc. Am. Acad. xxi. 408. — CHIHUAHUA, hillsides at the Frailes, on the mountains above Batopilas, 1885 (*Edw. Palmer*, no. 259).

b. Lower surfaces of leaves the pedicels and the calyces canescent with appressed short hairs: racemes very elongated, the verticels subequally remote: broad lip of corolla much exceeding the galea.

62. S. LEPTOSTACHYS, Benth. Lab. 258, & in DC. l. c. 308; Hemsl. l. c. 560; Briq. in Engl. & Prantl, l. c. — South central Mexico. JALISCO, near Plateado, Aug. 31, 1897 (*J. N. Rose*, no. 2682): MORELOS, hills near Cuernavaca, Nov. 10, 1895 (*C. G. Pringle*, no. 7078).

c. Lower surfaces of leaves canescent-tomentose, glabrate or glabrous: calyx villous or hirsute: galea and lip of corolla subequal.

63. S. POLYSTACHYA, Ort. Leaves broad-ovate, tomentose beneath: racemes panicled: calyx canescent, villous. — Dec. 55; Cav. Ic. i. 17, t. 27; HBK. l. c. 296; Benth. l. c.; Hemsl. l. c. 563; Briq. l. c. *S. linearifolia*, Lag. Nov. Gen. & Spec. 2. *S. Durandiana* (as subspecies), Briq. Bull. Soc. Bot. Belg. xxx. 238, & Ann. Conserv. Jard. Bot. Genève, ii. 138. — An extremely variable species, the typical form seen only from MICHOACAN, Tlalpujahua (*Graham*).

Var. CAESIA, Briq. Leaves narrow-ovate to ovate-lanceolate, glaucous, glabrous or minutely pubescent, not tomentose, beneath: inflorescence as in the type but racemes more elongated, the lower verticels often remote:

calyx generally with shorter pubescence. — Bull. Soc. Bot. Belg. xxx. 236 & Ann. Conserv. Jard. Bot. Genève, l. c. *S. caesia*, Willd. Enum. i. 40; HBK. l. c. 295. — Central Mexico to Central America. HIDALGO, Guadalupe, Valley of Mexico, Aug., 1865–66 (*Bourgeau*, nos. 721, 854), Aug. 17, 1865 (*Bilimek*, no. 316) : MEXICO, Takubaya, Aug. 28, 1865 (*Bilimek*, no. 315) : OAXACA, near Puebla, alt. 2,150 m., Nov. 9, 1895 (L. C. Smith, no. 908).

Var. **philippensis.** Leaves as in the species : racemes simple, elongated, 1 to 2 dm. long : calyx short villous. — OAXACA, Sierra de San Felipe, alt. 2,300 m., Sept. 1, 1894 (*E. W. Nelson*, no. 1175), Oct. 5, 1894 (*C. G. Pringle*, no. 4953).

Var. **seorsa.** Similar to the last : leaves glabrate beneath : racemes simple, elongated ; verticels many-flowered, the lower 2 to 3 cm. apart. — MEXICO, Valley of Mexico, Sept. 19, 1889 (*C. G. Pringle*, no. 2818).

Var. **albicans.** Leaves ovate, thinner than in the other forms, slightly canescent above, very white-tomentose beneath : racemes simple, 1 to 1.5 dm. long : calyx densely white-villous. — *S. purpurea*, var. *pubens*, Donnell Smith, l. c. iii. 67, not Gray. — GUATEMALA, Santa Rosa, Depart. Santa Rosa, alt. 920 m., Nov., 1892 (*Heyde & Lux* in exsicc. J. D. Smith no. 4394). An extremely canescent plant.

Var. POTOSINA, Briq. l. c. Leaves ovate-lanceolate or lanceolate, long-acuminate, pubescent as in the species : racemes simple, 1 dm. or less long : calyx hirsute. — SAN LUIS POTOSI, San José Pass, July 23, 1890 (*C. G. Pringle*, no. 3224).

d. Leaves pilose-hispid or glabrate beneath : stems and calyces pubescent with slender spreading glandular hairs.

64. **S. aequidistans.** Erect or ascending : stems 1.5 to 4 dm. high, glandular-hirsute : leaves rather remote, the lower small, the upper much larger, oblong-ovate to broadly deltoid-ovate, obtuse, the uppermost 3 to 4.5 cm. long, crenate-serrate, more or less setulose above : racemes slender, elongated, 0.5 to 2 dm. long ; the verticels 2–6-flowered, all remote, the lower equidistant, 2 to 3 cm. apart : pedicels filiform, 2 to 4 mm. long : calyx campanulate, strongly bilabiate, the tube twice or thrice as long as the ovate lips ; upper lip entire, lower short-cleft : corolla 1.3 cm. long, the pilose or glabrate tube ventricose, nearly twice exceeding the calyx ; lip a little exceeding the pilose galea : style bearded. — SINALOA, between Rosario and Colomas, July 12, 1897 (*J. N. Rose*, no. 1609).

= = = Calyx in anthesis 6 to 8 mm. long.

a. Leaves broad-ovate, crenate-serrate, obtuse: bracts large, broad-ovate: upper lip of purple glandular-hairy calyx tridentate: corolla dark-blue, with the calyx, bracts, &c., red-dotted.

65. S. TRICUSPIDATA, Mart. & Gal. l. c. 78; Benth. l. c. 311; Hemsl. l. c. 566. — OAXACA, Sierra de San Felipe, alt. 3,080 m., Aug. 28, 1894 (*C. G. Pringle*, no. 4845). Originally collected by Galeotti in the same mountains.

b. Leaves incised-serrate, acuminate: bracts minute, lance-subulate: calyx blue and green, minutely hispidulous, upper lip entire: corolla paler blue without red dots.

66. S. PRASIIFOLIA, Benth. Bot. Sulph. 151, & in DC. l. c. 310; Hemsl. l. c. 563. *S. aliena*, Greene, Pittonia, i. 157. — TEPIC, Maria Madre Island, April, 1877 (*W. T. Fisher*), May, 1897 (*E. W. Nelson*, no. 4247). Originally described from Tepic.

↔ ↔ Five species are not identified with recent material.

From the descriptions alone it is impossible to make out their exact relationships, or whether they are all distinct from the species here defined. These five plants are: — S. GRACILIS, Benth. Lab. 258, & in DC. l. c. 307, described from "New Spain"; S. PROTRACTA, Benth. in DC. l. c. 309, described from OAXACA; S. MEMBRANACEA, Benth. Lab. 259, & in DC. l. c. 310, described from "Mexico"; S. GLABRA, Mart. & Gal. l. c. 68, Benth. l. c., described from OAXACA; S. HERBACEA, Benth. Lab. 720, & in DC. l. c. 311, described from Tehuantepec, OAXACA.

↔ ↔ ↔ Leaves cuneate at base, or at least attenuate to the petioles.

= Leaves white-villous or pilose beneath.

a. Herbaceous.

1. Raceme dense, 4 to 7 cm. long: leaves densely villous beneath.

○ Leaves thick, crenulate-serrate.

67. S. XALAPENSIS, Benth. l. c. 308; Hemsl. l. c. 566; Briq. in Engl. & Prantl, l. c. *S. polystachya*, Mart. & Gal. l. c. 77, not Ort. — Southern Mexico. VERA CRUZ, Jalapa, alt. 1,230 to 1,380 m., Jan. 16, 1894 (*C. L. Smith*, nos. 1749, 1756); near Motzorongo and Omealca, Feb. 22, 1894 (*E. W. Nelson*, nos. 132, 177).

○ ○ Leaves thin, sharply serrate.

68. S. LONGISPICATA, Mart. & Gal. l. c. 73; Benth. l. c. 307; Hemsl. l. c. 560; Briq. l. c. — Southwestern Mexico. GUERRERO, between

Copala and Juchitango, alt. 60 to 185 m., Feb. 9, 1895 (*E. W. Nelson*, no. 2300). Originally collected by Galeotti in MICHOACAN.

2. Racemes looser, elongated, the terminal one 1 to 3 dm. long: leaves less densely villous.

○ Calyx in anthesis 4 to 5 mm. long: corolla 1 cm. long.

69. S. CORDOBENSIS, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 140. — Vera Cruz, Valley of Cordova, Aug. 24, 1866, and region of Orizaba, Aug. 12, 1866 (*Bourgeau*, nos. 1591, 2857); Cordova, alt. 790 m., Aug. 20, 1891 (*Seaton*, no. 431): PUEBLA, near Metlaltoyuca, alt. 250 m., Feb. 27, 1898 (*E. A. Goldman*, no. 72).

○ ○ Calyx in anthesis 8 to 9 mm. long: corolla 2 cm. long.

70. **S. monclovensis**. Stems sparingly pilose or glabrate: leaves ovate, acuminate, coarsely crenate-serrate, the primary ones 7 to 8 cm. long, unequally cuneate or rounded-cuneate at base, dark green and minutely puberulent above, canescent beneath, on petioles 3 to 4 cm. long: peduncles 1 dm. or less long: verticels 4–8-flowered, the lowest 1.5 to 3 cm. apart: bracts narrow-ovate, long-acuminate, the lowest 1.5 cm. long, sometimes leaf-like and slightly toothed: calyx minutely appressed-pubescent; the tube thrice exceeding the broad-ovate ciliate mucronate-short-acuminate lobes: corolla blue, sparingly pilose; the tube one half longer than the calyx; the lip twice exceeding the galea: style bearded. — COAHUILA, Caracol Mts., 33.8 km. southeast of Monclova, Aug., 1880 (*Edw. Palmer*, no. 1096).

b. Shrubby at base: leaves thinly villous.

1. Stem erect, pubescent: leaves crenate-serrate: calyx-lobes broad ovate: galea of corolla glandular-pilose.

71. S. WARSZEWICZIANA, Regel, Flora, xxxii. 184; Walp. Ann. iii. 257; Hemsl. l. c. 566. — Described from GUATEMALA. No specimen seen.

2. Stem ascending, branches sordid-villous: leaves sharply serrate: lower calyx-lobes lance-ovate, long-attenuate: galea villous not glandular.

72. S. SANCTAE-LUCIAE, Seem. Bot. Herald, 327; Hemsl. l. c. 565. — Western Mexico. TEPIC, Tepic, Jan. & Feb., 1892 (*Edw. Palmer*, no. 1964). Originally from Santa Lucia in the Sierra Madre.

= = Leaves glabrous or puberulent beneath, only the nerves sometimes hispid or pilose, or the youngest minutely canescent-tomentulose.

a. Calyx in anthesis 3 to 4 mm. long.

1. Leaves green and glabrous on both sides: calyx campanulate and angulate below, enlarged-cupuliform above.

73. S. JURGENSENII, Briq. l. c. 144. Described from OAXACA.

2. Young leaves canescent-tomentulose at least beneath: calyx simply campanulate.

74. **S. mazatlanensis.** Stems slender, minutely puberulent or glabrate: leaves rhombic-ovate or deltoid-ovate, with long acuminate entire tips, and entire cuneate bases, otherwise coarsely appressed-serrate, thin, dark green above, pale beneath, 2 to 4 cm. long, 1 to 3 cm. wide, on slender petioles 2 cm. or less in length: racemes elongate, 0.5 to 2 cm. long; verticels 2–10-flowered, all somewhat remote, the lowest 1 to 1.5 cm. apart: bracts lance-subulate, caducous: pedicels 2 to 4 mm. long: calyx glabrate; the tube twice exceeding the lobes; upper lip broad-ovate, entire, blunt and submucronate, the lower with ovate-lanceolate acuminate lobes: corolla blue, 1 to 1.2 cm. long; galea pilose, nearly equalling the lip. — SINALOA, head of Mazatlan River, Jan., 1889 (*W. G. Wright*, no. 1298); Mazatlan, Dec. 29, 1894 (*F. H. Lamb*, nos. 351, 355). Lamb's no. 395 from Villa Union has thicker leaves and puberulent calyx, and may not belong with the Mazatlan plant, though it is nearer related to that than to any other species.

b. Calyx in anthesis 5 to 6 mm. long.

1. Branches cinereous: leaves cinereous-puberulent beneath, rhombic-ovate, coarsely crenate-serrate: racemes rather loosely flowered, 1 to 3 dm. long; verticels 2–15-flowered: calyx tubulose-campanulate, somewhat pilose on the nerves.

75. S. JALISCANA, Briq. l. c. 141. *S. albiflora*, Gray, Proc. Am. Acad. xxi. 408, not Mart. & Gal. *S. albiflora*, forma *caerulescens*, Gray, l. c. *S. albiflora*, var. *caerulescens*, Gray, acc. to Wats. Proc. Am. Acad. xxii. 445, in part. — Western Mexico. CHIHUAHUA, shady ravines near Batopilas, 1885 (*Edw. Palmer*, nos. 96, 154, 157): JALISCO, in ravines and by shaded roadsides, Guadalajara, Sept., 1886 (*Edw. Palmer*, no. 488); by streams near Guadalajara, Nov., 1888 (*C. G. Pringle*, no. 1798).

2. Leaves glabrous, glabrate, or merely pubescent on the nerves beneath.

○ Leaves and calyces strictly glabrous: leaves with long-acuminate tips: calyx with short broad generally mucronate-tipped lobes.

76. S. ALBIFLORA, Mart. & Gal. l. c. 76; Benth. in DC. l. c. 307; Gray, Syn. Fl. l. c. 370; Hemsl. l. c. 552; Briq. in Engl. & Prantl, l. c. — Arizona to Venezuela. SONORA, moist places, Magdalena, Oct., 1857 (*Geo. Thurber*, no. 907): VERA CRUZ, Tolosa, Dec. 24, 1898 (*C. C. Deam*, no. 57): OAXACA, Santo Domingo, alt. 290 m., June 12, 1895 (*E. W. Nelson*, no. 2668).

○ ○ Lower faces of leaves and nerves of calyces pubescent.

+ Verticels crowded into a dense spiciform raceme 5 to 6 cm. long: stem shrubby.

77. S. PTEROURA, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 139. Described from COSTA RICA.

+ + Verticels becoming remote.

× Branches slender, glabrate: calyx tubular-campanulate, not enlarged above.

78. **S. Seemannii.** Frutescent (?): branches minutely pilose or glabrate, purplish; leaves elliptic-ovate, acuminate at the tip and at base to a slender petiole 1.5 to 3.5 cm. long, sharply serrate, above sparsely appressed-setulose, beneath minutely so on the nerves or glabrate, 4 to 7 cm. long, 2 to 4 cm. wide: raceme 1 dm. or less in length; verticels about 6-flowered, all a little remote, the lowest 1 cm. apart: bracts purple, lance-attenuate, persistent, slightly exceeding the setulose pedicels, 2 to 4 mm. long: calyx purple-tinged; the tube barely twice exceeding the lips; the upper lip broad-ovate, acuminate-subulate, the lower with lance-ovate acuminate lobes: corolla 1 cm. or so long, the tube a little exserted; galea pilose, equalling the lip: style bearded. — *S. flexuosa*, Seem. l. c. not Presl; Hemsl. l. c. 556, in part, with doubt. — Northwestern Mexico, in the Sierra Madre (*Seemann*).

× × Stems herbaceous, stout, densely puberulent in decussating bands: calyx slightly flaring above.

79. **S. fluviatilis.** Stems 1.5 m. or less high, very quadrangular: leaves rhombic-ovate, short-acuminate at tip, cuneate at base, crenate-serrate, the upper 5 to 9 cm. long, the lowermost broader, subtruncate at base, 1.5 dm. long, nearly as broad, puberulent above, especially on the nerves, cinereous beneath; petioles cinereous-puberulent, the lowest 5 cm. long, the others shorter: racemes slender, flexuous, the terminal becoming 2 dm. long; verticels 10–20-flowered, the lower remote, the lowest 1 cm. apart: bracts ovate, acuminate: pedicels filiform, becoming 2 to 3 mm. long: calyx green, strongly bilabiate, the tube twice exceeding the lips; the upper lip ovate, acuminate, entire, the lower with narrower attenuate lobes: corolla deep blue, pilose, 1 cm. long; the tube slightly exserted; galea about equalling the lip: style bearded. — MORELOS, by streams near Cuernavaca, alt. 1,540 m., May 16, 1898 (*C. G. Pringle*, no. 6850), Sept. 29, 1898 (*E. W. D. Holway*, no. 3028).

c. Calyx in anthesis 7 to 9 mm. long.

1. Stem and leaves glabrous: the latter 1 to 1.3 dm. long, serrate.

80. S. ALVAJACA, Oerst. Vidensk. Meddel. 1853, 38; Hemsl. l. c. 552. — Described from COSTA RICA. No specimen seen.

2. Stems and leaves pubescent, the stems glandular above.

○ Primary leaves 4 to 5 cm. long, crenate.

81. S. RHOMBIFOLIA, Ruiz & Pav. Fl. Per. & Chil. i. 26, t. 36, f. b.; Benth. l. c. 310; Hemsl. l. c. 564. — Doubtfully reported from Mexico by Benth. l. c.

○ ○ Primary leaves 1 dm. long, serrate.

82. **S. roscida.** Herbaceous? (only the top of the plant seen): stem closely glandular-puberulent above, the tip sparingly pilose: leaves very thin, elliptic-ovate, acuminate at both ends, coarsely and irregularly serrate, setulose-pilose above, sparingly so and minutely glandular-puberulent below; petioles slender, 5 cm. or less in length: racemes 1 to 1.5 dm. long; the verticels 6–12-flowered, all becoming remote, the lowest 3 to 4 cm. apart: bracts rhombic-ovate, long-acuminate, 6 to 8 mm. long: pedicels filiform, very glandular, 1 cm. or less in length: calyx glandular-puberulent, slightly setulose on the nerves, the long-attenuate lobes one half shorter than the cylindric-campanulate tube: corolla 1.8 cm. long, the tube exserted and slightly curved, glabrous, white; the blue lower lip somewhat exceeding the pilose galea: style included, bearded. — Northern Mexico. DURANGO, Chacala, alt. 920 m., March 5, 1899 (*E. A. Goldman*, no. 340).

+ Generally branching from the base, the stems slender and mostly decumbent: racemes long-peduncled. (Forms of *S. prunelloides* might be looked for here.)

++ Stems and leaves very setulose with long straight slender hairs.

= Leaves cuneate at base to short petioles or subsessile, obscurely crenate: bracts broad-ovate.

83. S. VERONICAEFOLIA, Gray in Wats. Proc. Am. Acad. xxii. 444. — JALISCO, on moist hillsides, Rio Blanco, June, 1886 (*Edw. Palmer*, no. 28); hillsides near Guadalajara, July 2, 1889 (*C. G. Pringle*, no. 2555).

= = Leaves truncate at base, coarsely crenate-dentate, long-petioled: bracts ovate-lanceolate.

84. **S. oreopola.** Stems repent at base, more or less assurgent, about 5 dm. long: leaves deltoid-ovate, dark green above, pale beneath, setulose on both surfaces, 2 to 3.5 cm. long, 1.5 to 3 cm. wide, on setulose petioles 1.5 to 2.5 cm. long: peduncles 7 to 10 cm. long; verticels 3–6-flowered, all becoming remote, the lowest 6 cm. apart: pedicels pubescent, 2 to 4 mm. long: calyx setulose, open-campanulate, strongly bilabiate; the broad purple upper lip blunt or acute, the lower with narrower

ovate-lanceolate acute lobes: corolla blue, 2 cm. long, the slightly pubescent tube twice exceeding the calyx; the blunt pilose galea one third as long as the broad lip: style densely bearded. — MORELOS, mountain side at 2,150 m. alt., near Cuernavaca, Aug. 9, 1898 (*C. G. Pringle*, no. 7643).

++ ++ Stems and leaves glandular-pilose, hardly setulose.

85. **S. villosa.** Stems 2.5 to 3 dm. high, glandular-pilose below, densely glandular-villous above and on the rhachis: leaves thick, pale green or cinereous, deltoid-ovate, mostly blunt at tip, subtruncate at base, entire or obscurely undulate, 1.5 to 3 cm. long, on cinereous-pubescent petioles 0.5 to 1.5 cm. long, the upper subsessile: peduncles 0.5 dm. long; verticels 3–6-flowered, all becoming remote, the lowest 2.5 to 3 cm. apart: bracts ovate, acuminate, setulose: pedicels slender, 2 to 3 mm. long: calyx blue-tinged, viscid, pilose-setulose, in anthesis 6 to 7 mm. long; the tube slightly longer than the lips; upper lips ovate, acuminate, entire, lower with two ovate acuminate lobes: corolla violet, 1.8 cm. long; the glabrous tube slightly exserted; the puberulent galea one third as long as the broad lip: style bearded. — SAN LUIS POTOSI, rare in the mountains, San Miguelito, 1876 (*Schaffner*, no. 678).

++ ++ ++ Stems and leaves mostly glabrous or puberulent or only sparingly setulose.

= Upper lip of calyx tridentate.

a. Calyx-tube hispid: leaves from orbicular to ovate-triangular, 3 to 6 cm. long, 2 to 4 cm. broad.

86. S. GLECHOMAEFOLIA, HBK. l. c. 290, t. 141; Benth. in DC. l. c. 306; Hemsl. l. c. 556; Briq. l. c. — South central and southern Mexico. SAN LUIS POTOSI, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 756): OAXACA, near Reyes, alt. 2,060 to 3,070 m., Oct. 20, 1894 (*E. W. Nelson*, no. 1794). Originally from near Guanajuato.

b. Calyx glabrous or minutely puberulent: leaves narrowly ovate-triangular, 1 to 1.75 cm. long.

87. S. FORRERI, Greene, Pittonia, i. 156. — DURANGO, Sierra Madre, west of Durango, alt. 2,500 m., Sept., Oct., 1881 (*A. Forrer*).

= = Upper lip of calyx entire, subulate-tipped; calyx densely white-pubescent with long fine viscid spreading hairs.

88. **S. prunifolia.** Stems puberulent, decumbent, assurgent only at the tips, 3 to 5 dm. long: leaves orbicular to obovate, rounded or acutish at tip, round or cuneate at base, crenate-serrate, the uppermost largest, 3 to 5 cm. long, 2.5 to 3.5 cm. broad, the lowest much smaller, dull green,

minutely puberulent above and on the nerves beneath, on puberulent petioles 0.2 to 1 cm. long: peduncles 7 to 10 cm. long, pubescent above with long fine spreading hairs; verticels 4–8-flowered, all becoming remote, the lowest 1.5 to 2 cm. apart: bracts narrow-ovate, acuminate: pedicels 2 to 3 mm. long: calyx in anthesis 5 to 6 mm. long, the tube twice exceeding the subulate-tipped lobes: corolla 1.3 to 1.5 cm. long, the glabrous tube one half exceeding the calyx; galea puberulent, half as long as the dark blue lip. — TEPIC, Santa Gertrudis, in the Sierra Madre, Aug. 8, 1897 (*J. N. Rose*, no. 3407).

D. Axilliflorae, Benth. Small much branched and depressed suffrutescent plants: the flowers borne in the axils of foliar leaves: corolla-tube scarcely ventricose.

* Leaves oblong-linear oblanceolate or spatulate, 0.5 to 1.5 cm. long, entire, canescently rough-hispid.

89. S. AXILLARIS, Moc. & Sess. in Benth. Lab. 270; Benth. in DC. l. c. 313; Hemsl. l. c. 553; Briq. l. c. — South central Mexico. Without locality (*Coulter*, no. 1118): SAN LUIS POTOSI, in the mountains, 1876 (*Schaffner*, no. 648), alt. 1,850 to 2,500 m., 1878 (*Parry & Palmer*, no. 698): GUANAJUATO, 1893 (*A. Dugès*, no. 228 A).

* * Leaves cuneate-obovate, 5 to 7.5 mm. long, 3-toothed, appressed-setulose.

90. S. CUNEIFOLIA, Benth. Lab. 270, & in DC. l. c.; Hemsl., l. c. 555; Briq. l. c. — Southern Mexico. HIDALGO, bare hills above Pachuca, alt. 2,600 m., July 18, 1898 (*C. G. Pringle*, no. 6905). Originally described from Oaxaca.

E. Candicantes, Benth. Shrubs: leaves oblong or lanceolate, rarely cordate, or when ovate not cordate, beneath tomentose or densely fine canescent, rarely pale and glabrate. (Some species approaching the *Scorodoniae*, others the *Erianthae*.)

* Calyx canescent short-pubescent or tomentose, not densely woolly.

+ Leaves entire or essentially so. (Reduced forms of *S. chamaedryoides* may be looked for here.)

++ Leaves sessile or subsessile, narrow-oblong, strongly revolute.

91. **S. Coulteri.** Branches ligneous, covered with gray-brown bark and numerous approximate leaf-scars: leaves densely cinereous-tomentulose with stellate hairs, strongly revolute, blunt at tip, truncate or subcordate at base, 1 to 1.5 cm. long, 2 to 4 mm. wide: racemes 2 to 3 cm. long; the rhachis pilose with long branching hairs; verticels about 6-flowered, slightly remote: calyx tubular-campanulate, glandular-pilose,

in anthesis 6 to 7 mm. long; the tube twice or thrice exceeding the lance-subulate teeth; upper lip tridentate: corolla 1.2 cm. long, short-pilose, the galea about equalling the lip: style slightly bearded.— Mexico, without locality (*Coulter*, no. 1120).

++ ++ Leaves narrowly triangular-ovate, truncate or slightly cordate at base, on thickish winged petioles, closely and densely white-pubescent beneath.

92. S. CANDICANS, Mart. & Gal. l. c. 61; Benth. l. c. 315; Hemsl. l. c. 554; Briq. l. c. — PUEBLA, limestone hills between Tehuacan and Esperanza, alt. 2,000 m., Dec. 21, 1895 (*C. G. Pringle*, no. 6245). Essentially the type station of the species.

++ ++ ++ Leaves narrow-ovate or oblong, attenuate at base to short petioles, or the upper subsessile.

= Calyx ovate tubular, with short blunt lobes, glandular-pubescent, in anthesis 5 to 6 mm. long: leaves closely white-pubescent beneath.

93. S. THYMOIDES, Benth. Lab. 255, & in DC. l. c. 314; Hemsl. l. c. 566; Briq. l. c. — Southern Mexico. PUEBLA, limestone hills between Tehuacan and Esperanza, alt. 2,000 m., Dec. 21, 1895 (*C. G. Pringle*, no. 6251): OAXACA, Mitla (*G. Andrieux*, no. 150); vicinity of Coixtlahuaca, alt. 2,150 to 2,300 m., Nov. 12, 1894 (*E. W. Nelson*, no. 1915). Species based in part on Andrieux's plant.

= = Calyx tubular-campanulate, with acuminate lobes, not glandular-pubescent, in anthesis 6 to 8 mm. long: leaves sparingly stellate puberulent or glabrate.

a. Leaves oblong, 1 to 2.5 cm. long, the uppermost subsessile.

1. Leaves finely stellate-puberulent at least when young.

94. **S. coahuilensis.** Freely branching mostly from the stout woody base; branches assurgent, 0.5 to 7 dm. high; bark pale brown, finely stellate-puberulent or glabrate: leaves confined mostly to the lower portions of the branches: racemes elongated, becoming 0.5 to 3.5 dm. long, the rhachis often glandular-puberulent; verticels mostly 2-flowered, all remote, the lowest 2 to 3 cm. apart: bracts ovate-oblong, acuminate, caducous: pedicels filiform, 2 to 4 mm. long: calyx granulose-puberulent; tube twice exceeding the ovate-lanceolate subequal lobes; upper lip entire: corolla 1.5 cm. long, blue with white centre; the glabrous tube nearly twice exceeding the calyx; the slightly pilose galea one half as long as the broad lower lip. — *S. chamaedryoides*, Wats., Proc. Am. Acad. xviii. 137, in part, not Cav. — COAHUILA, rocky hill, Saltillo, 1878 (*Parry*, no. 29), May, 1898 (*Edw. Palmer*, no. 194); Parras, June, 1880, and Lerios, July, 1880 (*Edw. Palmer*, nos. 1072, 1064).

2. Leaves glabrous.

95. S. LYCIOIDES, Gray, Proc. Am. Acad. xxi. 408. — CHIHUAHUA, cañons, Santa Eulalia Mts., May 1, 1885 (*C. G. Pringle*, no. 52).

b. Leaves ovate or ovate-oblong, 3 to 7 mm. long, all slender petioled.

96. **S. serpyllifolia.** Erect (?), 5 or 6 dm. high, the ascending branches brown, short-pubescent in decussating bands with minute white spreading or slightly recurved hairs; leafy to the inflorescence, the internodes 1 to 1.5 cm. long: racemes becoming 1 to 2 dm. long; verticels 2–6-flowered, all becoming remote, the lowest 1 cm. or so apart: bracts ovate, acuminate, ciliate, caducous: calyx short-hispidulous on the veins; tube thrice exceeding the ovate lobes; upper lip blunt, entire, lower with 2 short acuminate lobes: corolla 1.2 cm. long; the glabrous tube one-half longer than the calyx; the lower lip slightly exceeding the pilose galea: style slightly bearded. — *S. chamaedryoides*, Wats. Proc. Am. Acad. xviii. 137, in part, not Cav. — SAN LUIS POTOSI, without locality, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 751).

+ + Leaves crenate or crenate-serrate. (A form of *S. scorodoniaefolia* may be looked for here.)

++ Calyx lobes normal, not conspicuously broadened.

= Stems chalky-white with very close hirsute indumentum: leaves ovate, thin, slender-petioled, minutely white stellate beneath: verticels 6–10-flowered: calyx stellate-tomentulose; the tube thrice exceeding the short ovate lobes; the upper lip blunt, erect.

97. S. CEDROSENSIS, Greene, Bull. Cal. Acad. i. 212. — LOWER CALIFORNIA, Cedros Island, March, 1889 (*Edw. Palmer*, no. 684), March to June, 1897 (*A. W. Anthony*, no. 294); Magdalena Bay, Jan. 14, 1889 (*T. S. Brandegee*).

= = Stems and leaves (at least beneath) more or less cinereous-tomentulose with stellate hairs: verticels 2–6-flowered: calyx-tube twice exceeding the acuminate lobes.

98. S. CHAMAEDRYOIDES. Cav.[1] Leaves elliptic-ovate or narrowly deltoid-ovate, green above, slender-petioled, 1 to 2.5 cm. long. — Ic. ii. 77, t. 197; Sims, Bot. Mag. t. 808; Benth. l. c. 314; Hemsl. l. c. 554; Briq. l. c. *S. chamaedrifolia*, Andr. Bot. Rep. vi. t. 416. *S. Chamaedrys*,

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[1] **S. ramosissima.** Similar to *S. chamaedryoides*, very freely branching above: young branches slightly canescent with short spreading or somewhat recurved hairs: leaves paler beneath than above, more or less scabrous on both faces with short stiff simple hairs: calyx with similar pubescence on the nerves. — *S. chamaedryoides*, Gray, Syn. Fl. l. c. 371, not Cav. — Cañons of the Rio Grande, S.W. TEXAS, 1849 (*C. Wright*, no. 472 a): Organ Mts., NEW MEXICO, 1881 (*G. R. Vasey*).

Willd. Hort. Berol. i. 29, t. 29. — Central Mexico. ZACATECAS, plains, La Honda Station, Aug. 18, 1890 (*C. G. Pringle*, no. 3170): SAN LUIS POTOSI, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 753): HIDALGO, bare hills above Pachuca, alt. 2,600 ft., July 18, 1898 (*C. G. Pringle*, no. 6907): MEXICO, mountains near Mexico and Guadalupe, Aug. 24, 1865 (*Bourgeau*, no. 855).

Var. **isochroma.** Leaves reduced, 0.5 to 1.5 cm. long, short-petioled or subsessile, mostly crowded, canescent on both faces. — SAN LUIS POTOSI, in the mountains, San Rafael and San Miguelito, 1876 (*Schaffner*, nos. 663, 664); without locality, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, nos. 750, 751½).

= = = Stems with spreading pubescence: leaves 2 to 3 cm. long; blades little exceeding the petioles.

99. S. PAUCIFLORA, HBK. l. c. 303; Benth. l. c. 315; Hemsl. l. c. 563. — A doubtful species from "New Spain."

= = = = Of this section but not identified.

S. SPICATA, R. & S. Syst. Mant. i. 202 (*S. pulchella*, HBK. l. c. 288, t. 140, not DC. *S. pomifera*, Sessé & Moc. l. c. 7, ex. char., not L.) and S. BREVIFLORA, Moc. & Sessé in Benth. Lab. 274, species described from "New Spain" are placed by Bentham in this section. *S. spicata*, Gray, Syn. Fl. l. c. 461, is very different from the plate of *S. pulchella*, HBK.

+ + Calyx funnelform, the lobes becoming ampliate.

= Leaves ovate or ovate-orbicular, dark green above, much paler beneath, regularly crenate.

100. S. BALLOTAEFLORA, Benth. Leaves rugose, densely white-tomentulose beneath, 0.5 to 3 cm. long, rarely larger: racemes 0.5 to 8 cm. long. — Lab. 270, & in DC. l. c. 313; Torr. Bot. Mex. Bound. 131; Gray, l. c.; Hemsl. l. c. 553; Briq. l. c. *S. laxa*, Benth. l. c. — Texas to San Luis Potosi. Mexico, without locality (*Gregg*, no. 322): COAHUILA, Monclova, Aug., 1880, Parras, June, 1880, Lerios, July, 1880, Saltillo, May, 1898 (*Edw. Palmer*, nos. 1069, 1067, 1068, 107): TAMAULIPAS, 1843 (*Berlandier*, no. 3186): SAN LUIS POTOSI, San Rafael, 1876, (*Schaffner*, no. 670); near Matehuala, June 18, 1898 (*E. W. Nelson*, no. 4527).

Var. **Eulaliae.** Leaves large, 3 cm. long, broad-ovate, rugose, very slightly pubescent and hardly canescent beneath: racemes very numerous, 4 to 9 cm. long. — CHIHUAHUA, Santa Eulalia Mts., Sept. 1, 1885 (*C. G. Pringle*, no. 659).

Var. **pinguifolia.** Leaves large, as in the last, scarcely rugose, very pale beneath with a close very minute indumentum, not tomentulose, greasy to the touch: racemes all many-flowered. — NEW MEXICO, 1851–52 (*C. Wright*, no. 1524): ARIZONA, San Francisco Mts., back of Clifton, Sept. 3, 1880 (*E. L. Greene*, no. 300).

= = Leaves very pale on both surfaces, thick, hardly rugose, greasy to the touch, irregularly crenate.

101. S. PLATYCHEILA, Gray, Proc. Am. Acad. viii. 292, & Syn. Fl. l. c. — LOWER CALIFORNIA, Carmen Island, 1870, Nov. 1890 (*Edw. Palmer*, nos. 7, 878).

* * Calyx densely woolly: verticels in short spiciform racemes: lip of corolla distinctly exceeding the galea (otherwise approaching the *Erianthae*).

102. **S. confinis.** Branches canescent with fine stellate pubescence, leafy to the inflorescence: leaves oblong, blunt or acutish, rounded-truncate or subcuneate at base, very short-petioled, thick and rugulose especially along the closely crenulate margin, closely canescent on both surfaces, or ferrugineous-tinged beneath, 1.5 to 4.5 cm. long, 0.5 to 2 cm. wide: spiciform racemes simple or slightly paniculate, 1 to 4 cm. long, lowest verticels slightly remote: bracts large, broad-ovate, acuminate, somewhat persistent, 0.5 to 1 cm. long, stellate-tomentose: calyx dark blue, mostly hidden by dense white-lanate pubescence: corolla blue, scarcely 1 cm. long. — *S. spicata*, Gray, l. c. 461, not R. & S. — Southern Arizona and adjacent Mexico. ARIZONA, mountain pass near Fort Huachuca, 1882 (*Lemmon*, no. 2861): SONORA, Fronteras, alt. 1,400 m., Sept. 25, 1890 (*C. V. Hartman*, no. 43).

F. Scorodoniae, Benth. Shrubs with ovate (in *S. thyrsiflora* ovate-lanceolate) rugose leaves generally cordate, rarely cuneate, at base.

* Leaves white-tomentose beneath with simple hairs.

+ Leaves very rough-rugose above, mostly broad-ovate (except in variety of the first species) with obtuse or blunt tips.

++ Pedicels very short, at most 3 mm. long: racemes rather dense, often branching: calyx somewhat cuneate-campanulate, in anthesis 4 to 5 mm. long, with short flaring obtuse lobes.

= Pubescence of calyx glandular-villous.

103. S. SCORODONIAEFOLIA, Poir. Leaves ovate, subcordate. — Suppl. v. 46: Benth. l. c. 316; Hemsl. l. c. 565; Briq. l. c. *S. melissodora*, Lag. Gen. & Spec. Nov. 2. *S. hirta*, Schranck, Syll. Pl. Soc. Ratisb. ii. 60? according to Benth. *S. scorodonia*, Benth. Lab. 264. — Central and southern Mexico. SAN LUIS POTOSI, alt. 1,850

to 2,460 m., 1878 (*Parry & Palmer*, no. 730): MEXICO, Guadalupe June 21, 1865 (*Bourgeau*, no. 295): OAXACA, Valley of Cuicatlan, alt. 2,000 to 2,460 m., Nov. 10, 1894 (*E. W. Nelson*, no. 1898); San Juan del Estado, alt. 1,800 m., Oct. 20, 1895 (*L. C. Smith*, no. 930); Pápalo, Cuicatlan, alt. 1,650 m., Dec. 9, 1895 (*V. González*, no. 42).

Var. **crenaea**. Leaves narrower, oblong-lanceolate, blunt, rounded or subcuneate at base. — *S. scorodonia*, Benth. Pl. Hartw. 20, not Benth. Lab. 264. — A northern narrow-leaved extreme. AGUAS CALIENTES (*Hartweg*, no. 164): CHIHUAHUA, southwestern section, without locality, 1885 (*Edw. Palmer*).

= = Pubescence of calyx long-villous, not glandular.

104. S. LASIANTHA, Benth. Lab. 276, & in DC. l. c. 321; Hemsl. l. c. 559; Briq. l. c. — Range of the last from which it differs only in the more villous glandless calyx. Perhaps only a variety of that. DURANGO, Ramos to Inde, Aug., 1898 (*E. W. Nelson*, no. 4679): SAN LUIS POTOSI, in the mountains, San Rafael, 1876 (*Schaffner*, no. 671); without locality, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 731); limestone ledges, San José Pass, July 23, 1890, and limestone hills, Las Canoas, Oct. 8, 1890 (*C. G. Pringle*, nos. 3206, 3273): HIDALGO, calcareous hills near Tula, alt. 2,160 m., Oct. 5, 1896 (*C. G. Pringle*, no. 6538): OAXACA, near Dominguillo, alt. 2,000 m., Oct. 3, 1894 (*E. W. Nelson*, no. 1595). Placed by Bentham and by Briquet in the section *Erianthae*.

+ + Pedicels longer, 3 to 9 mm. long: racemes loosely flowered; verticels remote: calyx tubular-campanulate, in anthesis 6 mm. or more long.

= Calyx purplish-violet, glandular-villous, in anthesis nearly 1 cm. long: lower lip of corolla almost black; tube and galea pale.

105. S. SEMIATRATA, Zucc. Abhandl. Baier. Akad. Wiss. i. 298; Benth. in DC. l. c. 316; Hemsl. l. c. 565; Briq. l. c. — OAXACA, without locality, June (*Andrieux*, no. 149); calcareous hills, Las Sedas, alt. 1,850 m., Aug. 2, 1894 (*C. G. Pringle*, no. 4763), alt. 2,150 m., June 27, 1895 (*L. C. Smith*, no. 413); near city of Oaxaca, alt. 1,600 to 2,100 m., Oct. 2, 1894 (*E. W. Nelson*, no. 1511).

= = Calyx green (or blue-tinged), glandular-puberulent and minutely hispidulous on the nerves, in anthesis about 6 mm. long: coralla blue.

106. **S. Gonzalezii**. Branches very slender, somewhat villous, the youngest parts and the rhachises glandular-puberulent: leaves broad-ovate, bluntish at tip, truncate or subcordate at base, green and very rugose, slightly pubescent above, white-villous beneath, crenulate, 1 to

2.5 cm. long, 0.75 to 1.75 cm. broad, on villous petioles 1 cm. or less in length: racemes simple, 0.5 to 1.5 cm. long; verticels 3–8-flowered, all remote, the lowest 2 to 2.5 cm. apart: pedicels 3 to 5 mm. long, glandular-puberulent: calyx tubular-campanulate; the tube twice or thrice exceeding the ovate mucronate lobes; upper lip entire: corolla deep blue, 1.5 cm. long; the glabrate tube twice exceeding the calyx; the pilose galea slightly exceeding the dark lip: style bearded. — Oaxaca, El Parián-Etla, alt. 370 m., Nov., 1898 (*V. González & C. Conzatti*, no 903).

+– +– Leaves less rugose, narrow-ovate, mostly acuminate at tip.

++ Flowers in small cymes forming a terminal thyrsus: leaves ovate-lanceolate.

107. S. THYRSIFLORA, Benth. Bot. Sulph. 151, & in DC. l. c.; Hemsl. l. c. 566; Briq. l. c. — Southwestern Mexico, Tepic to Michoacan. Jalisco, vicinity of Mascota and San Sebastian, alt. 1170 to 1540 m., March, 1897 (*E. W. Nelson*, nos. 4057, 4081): Michoacan, mountains near Patzcuaro, Nov. 10, 1890, Dec. 21, 1891 (*C. G. Pringle*, nos. 3593, 4097). Originally from Tepic.

++ ++ Flowers in simple or more or less branched generally paniculately or virgately disposed racemes.

= Branches short-pilose with recurved spreading hairs.

a. Calyx tubular, in fruit 5 mm. long, the tube four times exceeding the very short broad lobes.

108. S. ALAMOSANA, Rose, Contrib. U. S. Nat. Herb. i. 110. — Sonora, Sierra de los Alamos, 1890 (*Edw. Palmer*, no. 345).

b. Calyx campanulate, in fruit 6 to 7 mm. long, the tube twice exceeding the narrower lobes.

109. S. CHAPALENSIS, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 145. — Jalisco, rich wooded cañons, mountains near Lake Chapala, Nov. 22, 1892 (*C. G. Pringle*, no. 4351).

= = Branches pubescent with ascending soft hairs.

110. **S. multiramea.** Stems about 1 m. high, freely paniculate-branched, the upper branches leafless and bearing racemes: leaves narrow-ovate, acuminate, rounded or subcordate at base, somewhat rugose and scabrous-hispidulous above, densely tomentose beneath, short-petioled, 2 to 5 cm. long, 1 to 2.5 cm. broad: inflorescence paniculate; lower branches leafy and axillary, upper naked; terminal racemes 1.2 dm. or less in length, the others shorter; verticels 2–12-flowered, all becoming remote: bracts lance-subulate, minute, early deciduous: pedicels 2 to

4 mm. long, spreading: calyx tubular, in anthesis 3.5 to 4 mm. long, appressed-pilose; the tube 3 or 4 times as long as the short blunt lobes: corolla blue, 1 to 1.2 cm. long; the glabrous tube one half longer than the calyx; the pilose galea twice exceeded by the exteriorly pilose lip: style bearded. — Southern Mexico. OAXACA, near city of Oaxaca, alt. 2,300 to 2,920 m., Sept., 1894 (*E. W. Nelson*, no. 1448), alt. 1,850 m., Oct. 25, 1894 (*C. G. Pringle*, no. 6013); near Reyes, alt. 1,700 to 2,060 m., Oct. 20, 1894 (*E. W. Nelson*, no. 1783); mountains of Jayacatlan, alt. 1,300 m., Nov. 4, 1894, alt. 2,000 m., Oct. 18, 1895 (*L. C. Smith*, nos. 272, 860); near Chilpancingo, alt. 2,770 to 3,140 m., Dec. 24, 1894 (*E. W. Nelson*, no. 2235): CHIAPAS, without locality (*Ghiesbreght*, no. 764).

* * Leaves, at least when young, pale beneath with stellate hairs.

+ Calyx densely invested with close stellate indumentum, not long woolly (except at the base in no. 114).

++ Leaves 1 to 1.5 cm. long.

111. S. FRUTICULOSA, Benth. Lab. 721, & in DC. l. c. 315; Hemsl. l. c. 556; Briq. in Engl. & Prantl, l. c. — OAXACA, near city of Oaxaca (*Andrieux*, no. 151).

++ ++ Leaves 2 to 6 cm. long.

= Branchlets and nerves of young leaves with sulphur-yellow indumentum.

112. **S. Conzattii.** Branching above, the younger parts densely stellate-tomentulose: leaves ovate, 1.5 to 6 cm. long, 0.75 to 3.5 cm. broad, rounded at tip, rounded-truncate or subcuneate at base, dark green and very rugose above, pale and very strongly reticulate-rugose beneath; margin finely crenulate; petioles 1.5 cm. or less in length: racemes spiciform, 2 to 6 cm. long, at first dense, the 3-many-flowered verticels later becoming a little remote, all the parts more or less red-punctate: bracts ovate-acuminate, exceeding the calyx, white-tomentose at base, yellowish at tip, soon deciduous: calyx ovate-campanulate, densely tomentose with pale blue freely-branching hairs, with very short blunt inconspicuous lobes: corolla 1.2 cm. long, blue, red-punctate and whitened above with stellate tomentum; tube somewhat exserted; the galea hardly equalling the lip: style bearded. — OAXACA, El Parián-Etla, alt. 370 m., Nov. 1898 (*V. González & C. Conzatti*, no. 902).

= = Branchlets and lower faces of leaves with white indumentum.

a. Leaves broad-ovate, sharply crenate-dentate: calyx-lobes blunt.

113. **S. pruinosa.** Rather stout shrub with pale brown bark, the younger parts densely pruinose with stellate hairs: leaves 2.5 to 5 cm.

long, 1.5 to 3.5 cm. wide, blunt at tip, rounded or subcuneate at base, green very rugose and glabrate above, very white beneath, irregularly crenate-dentate; petioles 1.25 cm. or less in length: racemes 1 dm. or less long; verticels many-flowered, rather crowded, the lowest 1 to 1.5 cm. apart; all the parts red-punctate; rhachis pruinose-pubescent: bracts ovate-acuminate, bluish, finely stellate-pubescent: calyx ovate-campanulate, closely pruinose-pubescent, bluish-tinged, in anthesis 4 to 5 mm. long; the tube twice or thrice exceeding the deltoid blunt lobes: corolla 1.2 cm. long, pruinose-stellate; the tube one half longer than the calyx; the galea about equalling the lip: style bearded. — JALISCO, road between Mesquitec and Monte Escobedo, Aug. 26, 1897 (*J. N. Rose*, no. 2601).

b. Leaves oblong-ovate, bluntly crenate: calyx-teeth subulate.

114. **S. Goldmanii.** Stem stout, 6 or 7 dm. high, herbaceous, or fruticose at base, puberulent, with numerous ascending branches above: leaves dull-green, slightly rugose above, cinereous and red-punctate beneath, 1 dm. or less long, bluntish at tip, rounded-cuneate to petioles 2 cm. or less in length: racemes 0.5 to 1.5 dm. long; verticels 6–12-flowered, the lower 2 cm. apart, the upper approximate; rhachis lanate: bracts lance-ovate, caducous: calyx in anthesis 5 to 6 mm. long, lanate at base, the deltoid subulate-tipped lobes one half as long as the tube: corolla red-punctate, 1.5 cm. long; the tube somewhat exserted, glabrous below; the lips stellate-pilose without, the lower exceeding the galea: style barely exserted, bearded. — Northwestern Mexico. CHIHUAHUA, near Batopilas, alt. 1690 to 2000 m., Oct. 4, 5, 1898 (*E. A. Goldman*, no. 214).

– + Calyx blue, invested in long white wool: leaves becoming glabrate, conspicuously red-punctate beneath.

115. S. RUBROPUNCTATA, Robinson & Fernald, Proc. Am. Acad. XXX. 121. — SONORA, in the cañon, Huehuerachi, Dec. 12, 1890 (*F. E. Lloyd*, no. 451).

* * * Leaves glabrous, or the youngest slightly puberulent on the nerves beneath.

116. **S. Nelsonii.** Shrub with smooth reddish-brown bark, the younger branchlets slightly puberulent: leaves ovate, blunt or acutish at tip, rounded at base, 1.5 to 5 cm. long, 1 to 3 cm. broad, dull green and obscurely rugose above, paler beneath, crenate-serrate: petioles slender, puberulent, 1 cm. or less in length: inflorescence more or less paniculate; the racemes 1 dm. or less long, the upper terminating leafless branches; verticels 6–12-flowered, becoming a little remote, the lowest 1 to 2 cm.

apart: calyx cuneate-campanulate, resembling that of *S. scorodoniaefolia*, densely short white-villous, in anthesis 5 to 6 mm. long; the tube three or four times exceeding the short blunt lips: corolla blue, pilose, 1.2 cm. long; the tube included or barely exserted; the lip slightly exceeding the galea: style bearded. — PUEBLA, between Acatlan and Piaxtla, alt. 1,230 to 1,380 m., Nov. 22, 1894 (*E. W. Nelson*, no. 2005). The calyx has a strong ginger-like fragrance.

* * * * Leaves pubescent beneath: plant not identified.

117. S. KEERLII, Benth. Lab. 263, & in DC. l. c. 316, with ovate cordate very rugose leaves canescent-tomentose beneath, and with dense paniculate-branched racemes, the calyx pilose-hirsute, not canescent-tomentose, described from Tlalpujahua, MICHOACAN, and from Regla.

G. Cordifoliae, Benth. Tall herbs or shrubs (ours herbs) with broad cordiform herbaceous leaves green or pale beneath and cordate at base, at least the lowermost long-petioled. (*S. purpurascens* & *S. Martensii* might be looked for here.)

* Stems pilose-hispid: leaves crenate, pale beneath: calyx pilose-hispid, more or less glandular.

118. S. AMARISSIMA, Ort. Dec. 4; Edw. Bot. Reg. iv. t. 347; Benth. l. c. 317; Hemsl. l. c. 553; Briq. l. c. 280. *S. circinata*, Cav. Ic. iv. 9, t. 318. *S. amara*, Jacq. Hort. Schoenb., iii. 2, t. 255. *S. hirsuta*, Sessé & Moc. l. c. 8. *S. amethystina*, Donnell Smith, Enum. Pl. Guat. i. 35, ii. 62, in part, not Smith. — *S. cyanea*, Donnell Smith l. c. iii. 67, iv. 125, not Benth. — A common species from Central Mexico to Central America and Panama. Without locality (*Uhde*, no. 791): SAN LUIS POTOSI, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 752): HIDALGO, hills above Pachuca, alt. 2,550 m., July 18, 1898 (*C. G. Pringle*, no. 6914): MEXICO, Guadalupe, Aug. 17, 1865 (*Bilimek*, no. 304); Valley of Mexico, May 11, 1865 (*Bourgeau*, no. 125, in part), Sept. 19, 1889 (*C. G. Pringle*, no. 2817); Rio Hondo Cañon, Aug. 22, 1890 (*C. G. Pringle*, no. 3153): MICHOACAN, Tlalpujahua (*Graham*): OAXACA, Monte Alban, alt. 1,790 m., July 20, 1894 (*L. C. Smith*, no. 171); Valley of Oaxaca, alt. 1,540 to 1,790 m., 1894 (*E. W. Nelson*, nos. 1103, 1289): GUATEMALA, Coban, Dept. Alta Verapaz, alt. 1,320 m., July, 1885, and Santa Rosa, Dept. Baja Verapaz, alt. 1,540 m., July, 1887 (*H. von Tuerckheim* in exsicc. J. D. Smith, nos. 110, 1192); San Lucas, Dept. Zacatepéquez, alt. 1,700 m., April, 1890 (*J. D. Smith*, no. 2187); Estanzuela, Dept. Santa Rosa, alt. 770 m., Aug., 1892, Santa Rosa, alt. 925 m., May, 1893, and Laguna de Ayarza, Dept. Ja-

lapa, alt. 2,460 m., Sept., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, nos. 4050, 4564, 4056 : Panama, Gatun (*Sutton Hayes*).

* * Stems puberulent above and slightly short-pilose on the angles, densely woolly at the nodes : leaves crenate-serrate : calyx puberulent and minutely pilose.

119. S. sidaefolia, Mart. & Gal. l. c. 67 ; Benth. l. c. 318 ; Hemsl. l. c. 565 ; Briq. l. c. — Oaxaca, wet ravines, Sierra de San Felipe, alt. 2,600 m., Jan. 3, 1895 (*C. G. Pringle*, no. 5643). Originally collected in the cordillera of Oaxaca.

H. Rudes, Benth. Herbs with ovate leaves cordate at base, subsessile or very short-petioled.

* Bracts ovate-lanceolate, 1 to 1.5 cm. long, firm and persistent : calyx in anthesis 1 cm. long : corolla crimson, 3 cm. long : plant weak, pilose-hispid, the leaves firm and lucid.

120. S. sessilifolia, Gray in Wats. Proc. Am. Acad. xxii. 445 ; Briq. Ann. Conserv. Jard. Bot. Genève, ii. 152. — Jalisco, bottom of ravine, Rio Blanco, July, 1886 (*Edw. Palmer*, no. 184) ; ravines near Guadalajara, July 1, 1889 (*C. G. Pringle*, no. 3058). In its corolla approaching the *Fulgentes*.

* * Bracts minute, caducous.

← Stems simple or subsimple from woody base, more or less pilose : leaves green on both faces, blunt or obtuse : calyx in fruit 7 to 8 mm. long.

121. S. platyphylla, Briq. l. c. 50. *S. amarissima*, Wats. l. c., not Ort. — Jalisco, hills, Rio Blanco, July, 1886 (*Edw. Palmer*, no. 183) ; hillsides near Guadalajara, July 3, 1889 (*C. G. Pringle*, no. 2560).

← ← Stem freely branching above, pilose with somewhat recurved hairs : leaves canescent, pilose beneath, acuminate : fruiting calyx about 5 mm. long.

122. S. nepetoides, HBK. l. c. 299, t. 150. *S. amarissima*, Benth. l. c. 317, as syn. ; Hemsl. l. c. 553, as syn. ; not Ort. — South central Mexico. Morelos, mountain side near Cuernavaca, alt. 2,160 m., Aug. 9, 1898 (*C. G. Pringle*, no. 7612). Originally from Guanajuato.

§ 4. Erianthae, Benth. Shrubs generally with rugose leaves (not in *S. populifolia*). Calyx densely lanate. Lips of the corolla subequal or the galea longer ; the tube a little exserted, straight, ventricose or enlarged above.

* Pubescence of calyx purple or rose-colored.

← Leaves lanceolate or linear-lanceolate, green above, white-lanate beneath : raceme elongated, 4 dm. or less in length : corolla white, lanate.

123. S. leucantha, Cav. Ic. i. 16, t. 24 ; Hook. Bot. Mag. t. 4318 ; Benth. l. c. 321 ; Hemsl. l. c. 560 ; Briq. in Engl. & Prantl, l. c. *S.*

bicolor, Sessé & Moc. l. c. 8. — Coahuila to Oaxaca, often cultivated. Without locality (*Graham*): COAHUILA, garden at Saltillo, 1848–49 (*Gregg*, no. 597): ZACATECAS, in plaza, Monte Escobedo, Aug. 27, 1897, and on the Sierra de los Morones, near Plateado, Sept. 1, 1897 (*J. N. Rose*, nos. 2641, 3627): SAN LUIS POTOSI, near Santa Maria, 1876 (*Schaffner*, no. 669).

+ + Leaves ovate, subcordate: corolla reddish.

++ Leaves very rugose, 2.5 to 4 cm. long, on short petioles 4 to 8 mm. long.

124. S. LANTANAEFOLIA, Mart. & Gal. l. c. 69; Benth. l. c. 322; Hemsl. l. c. 559; Briq. l. c. — PUEBLA, Atlixco, July 25–Aug. 1, 1893 (*E. W. Nelson*). Originally from PUEBLA. Seaton's no. 500 from Maltrata, VERA CRUZ, is near this species but not satisfactorily referable to it.

++ ++ Leaves hardly rugose, 0.5 to 1 dm. long, on petioles 1.5 to 2.5 cm. long.

125. **S. populifolia.** Shrub with gray bark: branchlets and petioles lanate with yellowish white pubescence: leaves ovate, bluntly acuminate, crenulate, green and puberulent above, white-velutinous beneath: raceme 1.5 dm. or less in length, simple or with a tendency to branch; verticels about 6-flowered, becoming a little remote: bracts ovate, acuminate, 1 cm. long, purple-lanate without, soon deciduous: calyx campanulate, in anthesis 1.8 cm. long, the tube twice or thrice exceeding the deltoid acuminate lobes; upper lip entire, lower 2-lobed: corolla pilose, reddish, 3.5 cm. long, the galea slightly exceeding the lip: long-exserted portion of style glabrous. — JALISCO, Bolaños, Sept., 1897 (*J. N. Rose*, no. 2862).

* * Pubescence of dorsal and ventral portions of calyx dark red, of the sides brilliant yellow: corolla dark red; the lip much shorter than the galea: leaves ovate-lanceolate, acuminate at base, very rugose above.

126. S. PITTIERI, Briq. Bull. Soc. Bot. Belg. XXX. pt. 1, 237. Described from COSTA RICA, and doubtfully referred by its author to this group.

§ 5. MACROSTACHYAE, Benth. Pubescent large-leaved shrubs or herbs. Racemes dense, thick, with large thick firm leaf-like persistent bracts. Corolla blue or white, twice or thrice as long as the calyx.

* Villous herb: leaves ovate, rounded or subcuneate to a winged petiole: verticels very many-flowered, somewhat remote.

127. S. CLINOPODIOIDES, HBK. l. c. 294, t. 145; Benth. l. c.; Hemsl. l. c. 554; Briq. l. c. *S. parquerensis*, Moc. & Sess. in Benth. Lab. 273;

Benth. in DC. l. c.; Hemsl. l. c. 562; Briq. l. c. *S. patzcuarensis*, Sess. & Moc. Pl. Nueva España, ed. 2, 8. — Sierra Madre of Western Mexico. CHIHUAHUA, 100 km. S. of Guadalupe y Calvo, alt. 2,300 to 2,600 m., Aug., 1898 (*E. W. Nelson*, no. 4807). MICHOACAN, sandy fields, hills of Patzcuaro, Oct. 11, 1892 (*C. G. Pringle*, no. 4258). Originally collected by Humboldt & Bonpland near Patzcuaro.

* * Canescent-puberulent shrub: the firm leaves pale beneath: corolla pale blue or whitish.

128. S. SHANNONI, Donnell Smith, Bot. Gaz. xix. 256. — Southern Mexico and Central America. CHIAPAS, top of ridge back of Tonala, alt. 370 to 770 m., Aug. 10, 1895 (*E. W. Nelson*, no. 2898): GUATEMALA, Volcan Chingo, Dept. Jutiapa, alt. 925 m., Oct., 1892 (*W. C. Shannon* in exsicc. J. D. Smith, no. 3612); Chupadero, Dept. Santa Rosa, alt. 1,540 m., Oct., 1892 (*Heyde & Lux* in exsicc. J. D. Smith no. 4052). The Chiapas plant has broader leaves and bracts than those from Guatemala, but they undoubtedly belong together.

§ 6. LONGIFLORAE, Benth. Corolla from 2 to 12 cm. long, of various colors. (See note under § *Brachyanthae*.)

A. Luteae, Benth. Shrubs with axillary or racemose flowers: corolla yellow, ventricose below the throat.

* Flowers axillary, solitary: corolla 2 to 3 cm. long: leaves cordate-ovate, 2.5 cm. or less long, very rugose, canescent-tomentose beneath.

129. S. ASPERA, Mart. & Gal. l. c. 71; Benth. in DC. l. c. 327; Hemsl. l. c. 553; Briq. l. c. — Southern Mexico. PUEBLA, dry calcareous hills, Tehuacan, alt. 1,700 m. [the original station of Galeotti], Nov. 27, 1895 (*C. G. Pringle*, no. 6240): OAXACA, Jayacatlan, alt. 1,320 m., June 3, 1894, and Nov. 18, 1895 (*L. C. Smith*, nos. 17, 897); near Dominguillo, alt. 2,000 m., Oct. 3, 1894 (*E. W. Nelson*, no. 1587).

* * Flowers racemose.

+ Calyx invested with yellow or yellow and reddish tomentum: corolla yellow, red within, 2 to 3 cm. long: leaves rugose, canescent-tomentose beneath.

130. S. CHRYSANTHA, Mart. & Gal. l. c. 72; Benth. l. c. 326; Hemsl. l. c. 554; Briq. l. c. — Southern Mexico and Central America. GUERRERO, between Tlapa and Tlaliscatilla, alt. 1,200 to 1,380 m., Dec. 5, 1894 (*E. W. Nelson*, no. 2049); OAXACA, Monte Alban, alt. 1,850 m., Sept. 4, 1894 (*C. G. Pringle*, no. 4862), Oct. 11, 1895 (*L. C. Smith*, no. 950); Valley of Oaxaca, alt. 1,540 to 1,630 m., Sept. 25, 1894 (*E. W. Nelson*, no. 1244): CHIAPAS, without locality (*Ghiesbreght*, no.

765); between San Cristobal and Teopisca, alt. 2,060 to 2,600 m., Dec. 4, 1895, and between Hacienda Juncana and San Vincente, alt. 1,300 to 1,850 m., Dec. 12, 1895 (*E. W. Nelson*, nos. 3429, 3507).

+ + Calyx glandular-puberulent: corolla 3.5 to 4 cm. long: leaves cordate, acuminate, the lowest often 3 dm. long.

131. S. MADRENSIS, Seem. Bot. Herald, 327, t. 70; Hemsl. l. c. 560. — Described from the Sierra Madre of northwestern Mexico. Not seen.

B. Inflatae, Benth. Shrubs: calyx inflated-companulate, brightly colored: corolla scarlet; the tube subventricose. (Calyx and corolla by rare exception white.)

* Leaves ovate-lanceolate to oblong, cuneate or narrowed at base.

+ Calyx and corolla glabrous or merely puberulent: style glabrous.

132. S. SESSEI, Benth. Lab. 288, & in DC. l. c. 332; Hemsl. l. c. 565; Briq. l. c. 282. *S. Roezli*, Scheidw. Fl. des Serres, xiv. 31, t. 1407. *S. semperflorens*, La Llave in La Nat. vii. Apénd. 81, ex char. *S. fastuosa*, Sessé &. Moc. l. c. 7. *Rhodochlamys speciosa*, Schauer, Linnaea, xx. 707. — Southern Mexico. MORELOS, Cuernavaca, Nov. 14, 1865 (*Bourgeau*, no. 1238).

+ + Calyx and corolla glandular-pilose: style pilose.

133. S. WAGNERIANA, Polak. Linnaea, xli. 591. — Described from Costa Rica. Not seen.

* * Leaves ovate-lanceolate, cordate at base: stems viscid-hirsute.

134. S. ADGLUTINANS, Lag. Gen. & Spec. Nov. 2; Benth. l. c.; Hemsl. l. c. 552; Briq. l. c. — Described from "New Spain." Not seen.

* * * Leaves ovate, acuminate, rounded at base, white-tomentose beneath, 1 dm. or less in length: branches tomentose: shrub or small tree (1 to 6 m. high).

135. S. PUBESCENS, Benth. Lab. 723, & in DC. l. c.; Hemsl. l. c. 563; Briq. l. c. — Southern Mexico. MORELOS, near Cuernavaca, Oct. 27, 1895, and Nov. 9, 1895, calyx and corolla white (*C. G. Pringle*, nos. 7080, 7065): OAXACA, San Dionicio (*Andrieux*, no. 143); Jayacatlan, alt. 1,380 m., Sept. 10, 1894 (*L. C. Smith*, no. 170); Monte Alban, alt. 1,790 m., Oct. 4, 1894 (*C. G. Pringle*, no. 4960); near Oaxaca, alt. 1,600 to 1,930 m., Oct. 2, 1894, near Huajuapam, alt. 1,470 to 2,000 m., Nov. 19, 1894, and near Tlapancingo, alt. 1,850 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, nos. 1972, 1521, 2091).

*** * * * Leaves deltoid–ovate to orbicular, coriaceous, pubescent on the nerves beneath, 4 cm. or less long: branches slender, purplish, glabrous or glabrate.**

136. S. Regla, Cav. Ic. v. 33, t. 455; Benth. Lab. 288, & in DC. l. c., 333; Lindl. Bot. Reg. xxvii. t. 14; Hemsl. l. c. 564; Briq. l. c. *S. deltoidea*, Pers. Syn. i. 28. *S. negla*, Pers. l. c. as syn. *S. crenata*, Mart. & Gal. l. c. 74; Benth. l. c. 348; Hemsl. l. c. 555; Briq. Ann. Conserv. Jard. Bot. Genève, ii. 157. — Central and southern Mexico. Without locality (*Coulter*, no. 1099, *Gregg*, no. 340): Coahuila, Lerios, July, 1880 (*Edw. Palmer*, no. 1079); shaded gulches of limestone hills, Carneros Pass, Sept. 1, 1889 (*C. G. Pringle*, no. 2384): Durango, Santiago Papasquiaro, 1896 (*Edw. Palmer*, no. 404), Aug. 7, 1898 (*E. W. Nelson*, no. 4663): San Luis Potosi, in woods, San Rafael, 1876 (*Schaffner*, no. 665); without locality, 1878 (*Parry & Palmer*, no. 741); San Luis Potosi, 1898 (*Edw. Palmer*, no. 726): Aguas Calientes, by brooks (*Hartweg*, no. 165): Guanajuato, 1880 (*A. Duqès*): Oaxaca, near Coixtlahuaca, alt. 2,150 to 2,300 m., Nov. 12, 1894 (*E. W. Nelson*, no. 1917).

C. Fulgentes, Benth. Shrubs, rarely herbs: calyx tubulose-campanulate: corolla scarlet or crimson; the tube straight, ventricose.

*** Freely branching shrubs (rarely herbs) with leaves 1 to 4 cm. long.**

+ Flowers axillary.

137. **S. disjuncta.** Branches ferrugineous-pubescent: leaves cordate, ovate, blunt or acuminate, 4 cm. or less long, rugose, crenulate, dark green and hispid above, canescent and pilose beneath, on slender petioles: verticels mostly 2-flowered, in the axils: pedicels 6 mm. or less in length, usually twisted: calyx pilose on the nerves, in anthesis 1.2 to 1.5 cm. long; the tube twice exceeding the ovate acuminate lobes; upper lip entire: corolla 3 to 4 cm. long, minutely pilose, the ventricose tube twice exceeding the calyx; galea and lip subequal: style bearded. — Chiapas, among rocks, Aug., Sept. (*Ghiesbreght*, nos. 76, 753); near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895 (*E. W. Nelson*, no. 3166). **A unique species.**

+ + Flowers in terminal racemes.

++ Leaves ovate or broad oblong.

= Pubescence of branches and leaves simple.

***a.* Calyx hispidulous on the nerves.**

1. Leaves glabrous or at least glabrate beneath.

138. S. Grahami, Benth. Bot. Reg. xvi. t. 1370, & in DC. l. c. 335; Lodd. Bot. Cab. xviii. t. 1798; Ortgies, Gartenfl. vii. t. 242; Hemsl.

l. c. 557; Briq. in Engl. & Prantl l.c. *S. microphylla,* Gray, Proc. Am. Acad. xxi. 407, in part, not Benth. — Northern and central Mexico, not clearly separable from *S. microphylla.* CHIHUAHUA, 100 km. south of Guadalupe y Calvo, alt. 2,300 to 2,620 m., Aug., 1898 (*E. W. Nelson*, no. 4812[a]); Batopilas, alt. 1,690 to 2,000 m., Oct. 1898 (*E. A. Goldman*, no. 212): COAHUILA, hillside, Saltillo, May, 1898 (*Edw. Palmer*, no. 161): DURANGO, by stream, Durango, Nov. 1896 (*Edw. Palmer*, no. 844); near El Salto, July 12, 1898, and in the Sierra Madre, 25 km. north of Guanacevi, alt. 2,300 to 2,620 m., Aug. 17, 1898 (*E. W. Nelson*, nos. 4557, 4755): ZACATECAS, hills of Zacatecas, Oct. 26, 1888 (*C. G. Pringle*, no. 1764); in the Sierra Madre, Aug. 18, 1897, and near Plateado, Sept. 4, 1897 (*J. N. Rose*, nos. 2402, 2804): SAN LUIS POTOSI, in the mountains about San Luis Potosi, 1876 (*Schaffner*, no. 660), 1878 (*Parry & Palmer*, nos. 747, 748): VERA CRUZ, Mt. Orizaba, alt. 2,770 m., Aug. 8, 1891 (*Seaton*, no. 260): HIDALGO, Zimapan (*Coulter*, no. 1093): MEXICO, ledges and banks, Sierra de las Cruces, Oct. 23, 1892, and Serrania de Ajusco, alt. 2,770 m., May 23, 1898 (*C. G. Pringle*, nos. 4298, 7548).

2. Leaves pubescent beneath.

○ Shrubs.

+ Leaves mostly less than 2 cm. long.

139. S. MICROPHYLLA, HBK. l. c. 295. Leaves rounded at tip, slightly pubescent. — Benth. l. c.; Hemsl. l. c. 561; Gray, l. c., in part; Briq. l. c. — Central and southern Mexico. SAN LUIS POTOSI, San Miguelito, 1876 (*Schaffner*, no. 662); in market of San Luis Potosi, 1898 (*Edw. Palmer*, no. 640½): MEXICO, Valley of Mexico (*Schaffner*, no. 394); Toluca, Sept. 17, 1898 (*E. W. D. Holway*, no. 3136): OAXACA, Tehuacan, alt. 615 m., June 24, 1896 (*C. Conzatti*, no. 163).

Var. CANESCENS, Gray, l. c. Leaves and branchlets densely canescent-pubescent. — CHIHUAHUA, in shade of cliffs, hills near Chihuahua, Oct. 17, 1885 (*C. G. Pringle*, no. 637): ZACATECAS, hills near Zacatecas, Mar. 17, 1885 (*C. G. Pringle*, no. 239), alt. 2,460 m. Dec. 8, 1898 (*C. C. Deam*, no. 139).

Var. WISLIZENI, Gray, l. c. 408. Puberulent: leaves narrowed to acutish tips. — CHIHUAHUA, Sierra Madre west of Chihuahua (*Wislizenus*, no. 152); north of Batopilas, 1885 (*Edw. Palmer*, no. 379).

++ Leaves larger.

× Leaves subsessile or short (3 mm.)-petioled.

140. S. TRICOLOR, Lemaire, Ill. Hort. iii. Misc. 71, t. 120, & Fl. des

Serres, xii. 109, t. 1237; Hemsl. l. c. iv. 81. — Introduced into cultivation from Mexico.

× × **Leaves long-petioled.**

‡‡ **Corolla 2.5 to 2.75 cm. long.**

□ **Leaves thin, hardly rugose, with subacuminate tips, pubescence rather sparse.**

141. S. Lemmoni, Gray, Proc. Am. Acad. xx. 309, & Syn. Fl. l. c. 461; Hemsl. l. c. — Arizona and Chihuahua. Chihuahua, Cañon de San Diego, Sept. 17, 1891 (*C. V. Hartman*, no. 738); foothills of Sierra Madre, near Colonia, Aug. 29, 1899 (*E. W. Nelson*, no. 6315).

□ □ **Leaves rugose, mostly rounded at tips: pubescence more abundant.**

142. **S. neurepia.** Freely branching shrub: branches puberulent, the younger parts pilose or densely villous: leaves ovate or round-ovate, truncate or subcordate at base, coarsely crenate, thick, rather densely short-pubescent on both faces, 2.25 to 2.75 cm. long, twice exceeding the slender petioles: racemes 1 dm. or less in length; verticels mostly 2-flowered, all becoming a little remote: bracts ovate, ciliate, caducous: calyx glandular-puberulent, a little hispidulous on the nerves, tubular-campanulate, in anthesis 1 to 1.3 cm. long; the tube twice exceeding the ovate-acuminate lobes: upper lip entire: corolla-tube pale, glabrous, twice exceeding the calyx; the pilose galea hardly equalling the red lip: style bearded. — Central Mexico. San Luis Potosi, in woods near Morales, 1876 (*Schaffner*, no. 661); without locality, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 754); in the market of San Luis Potosi, 1898 (*Edw. Palmer*, no. 640). Graham's no. 1096 without locality apparently belongs here, and Bourgeau's no. 856 from near Guadalupe, Mexico, though with larger thinner leaves, may be an extreme form. This species, as well as *S. microphylla*, is sold in the market of San Luis Potosi as a *Mirto*, decoction from them being used to allay fever, headaches, and nervous irritations.

‡‡ **Corolla 3.25 to 3.5 cm. long.**

143. **S. Schaffneri.** Branches glandular-puberulent and slightly pilose: leaves thickish, rugose, deltoid-ovate, acuminate, rounded-truncate at base, puberulent on both faces, 2.5 to 4 cm. long, 1.5 to 3 cm. wide, irregularly crenulate, on slender petioles 1 to 2.5 cm. long: racemes becoming 1 to 1.5 dm. long; verticels mostly 4-flowered, all becoming remote, the lowest 2.5 cm. apart: bracts 5 mm. long, ovate, long-acuminate: pedicels 3 to 5 mm. long: calyx tubular-campanulate and minutely hispidulous, in anthesis, 1 to 1.2 cm. long; the tube twice

exceeding the lobes; upper lip oblong-ovate, entire, blunt, lower with two acuminate narrower lobes: corolla-tube glabrous, twice exceeding the calyx; galea slightly pilose at tip, shorter than the lip. — San Luis Potosi, in the mountains near Morales, 1876 (*Schaffner*, no. 667), called "mirto grande." Habitally this plant suggests *S. fulgens*, var. *Boucheana*, Benth., but it is readily distinguished by its less pubescent leaves, shorter calyx and slightly pilose galea.

○ ○ Pubescent herb with ovate obtuse leaves canescent beneath.

144. S. obtusa, Mart. & Gal. l. c. 72; Benth. in DC. l. c. 334; Van Houtte, Fl. des Serres, xiv. t. 1412 (?); Hemsl. l. c. ii. 562. — Described from Oaxaca. Various plants are cultivated under this name, but the figure above cited perhaps best represents the species.

b. Calyx glabrous or barely puberulent at base.

145. **S. oresbia.** Small shrub, 2 to 3 dm. high: branches purplish, puberulent in lines or glabrate: branchlets short, leafy mostly at the tip: leaves firm, ovate, acute at each end, appressed-serrate, glabrate, 1 to 2.5 cm. long: racemes 1 dm. or less in length; verticels 2–4-flowered: bracts firm, ovate, acuminate, 1 cm. or less long, persistent: pedicels 3 to 7 mm. long, puberulent: calyx purple-tinged, in anthesis 1 to 1.2 cm. long, puberulent within; the tube thrice exceeding the broad ovate mucronate-acuminate lobes: corolla 2 cm. long; the glabrous strongly ventricose tube one half longer than the calyx; the pilose galea hardly equalling the lip: style glabrous. — San Luis Potosi, in the mountains, San Rafael, 1876 (*Schaffner*, no. 666); without locality, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 740).

= = Pubescence of branches and leaves stellate.

146. **S. oaxacana.** Very branching shrub: the bark pale gray, the young branches and branchlets white with stellate tomentum: leaves ovate, truncate or cordate at base, 1 cm. or less in length, pale green and strongly rugose above, white-tomentose beneath, crenate, one-half longer than the tomentose petioles: racemes 6 cm. or less long; the verticels mostly 2-flowered, 1 to 1.5 cm. apart: bracts ovate-lanceolate, caducous: pedicels 3 to 6 mm. long, glandular-pilose: calyx open-campanulate, glandular-pilose, in anthesis 8 to 10 mm., in fruit becoming 1.3 to 1.5 cm. long: the upper lip broad-ovate, mucronate, somewhat bidentate, the lower lip with 2 ovate-lanceolate acuminate lobes: corolla somewhat glandular-pilose; the strongly ventricose tube twice exceeding the calyx; the galea and lip subequal: style bearded. — Oaxaca, La Hoya Cañon,

alt. 1,380 m., Nov. 2, 1894 (*C. G. Pringle*, no. 5654). Resembling *S. aspera*, Mart. & Gal., from which it differs in its short terminal racemes of red flowers.

++ ++ Leaves from narrow oblong to linear-oblanceolate.

147. S. GREGGII, Gray, Proc. Am. Acad. viii. 369, & Syn. Fl. l. c 368; Hemsl. l. c. 557, & iv. 81; Hook. Bot. Mag. t. 6812. *S. microphylla*, Torr. Bot. Mex. Bound. 131, not HBK. — Texas to Durango. COAHUILA, cañon above Palomas, 1848–49 (*Gregg*, no. 335); high dry ridge, battlefield of Buena Vista (*Gregg*); Saltillo, 1878 (*Parry*, no. 26); Lerios, July, 1880, and near Saltillo, May, 1898 (*Edw. Palmer*, nos. 1071, 153): DURANGO, shady hillsides and river-banks, Santiago Papasquiaro, Aug., 1896 (*Edw. Palmer*, no. 417).

* * Branching or subsimple shrubs or half-shrubs or tall herbs, leafy nearly or quite to the inflorescence; leaves larger, only the smallest 4 cm. long.

+ Leaves pubescent beneath.

++ Calyx-lobes with long setaceous-acuminate tips: corolla 2.5 to 4 cm. long: branches densely tomentose, viscid above.

= Leaves densely tomentose beneath, minutely so above.

148. S. LINDENII, Benth. in DC. l. c. 333; Hemsl. l. c. ii. 560; Briq. l. c. — Southern Mexico and adjacent Central America. OAXACA, between Pluma and San Miguel Suchistepec, alt. 2,460 to 3,070 m., March 21, 1895 (*E. W. Nelson*, no. 2508): CHIAPAS, without locality (*Ghiesbreght*, nos. 122, 755): GUATEMALA, Volcan de Agua, Dept. Zacatepéquez, alt. 2,770 m., Apr., 1890 (*J. D. Smith*, no. 2169).

= = Leaves greener, thinly pubescent beneath, becoming glabrate above.

149. S. RECTIFLORA, Vis. Sem. Hort. Pat. 1839, ex ejusd. Ort. Bot. Pad. 145; Benth. l. c. 334; Hemsl. l. c. 564, excl. syn. — South-central Mexico. GUANAJUATO, rocky mountain-slopes, 1880, 1894 (*A. Dugès*).

++ ++ Calyx-lobes blunt or mucronate or merely short-acuminate.

= Corolla 4 to 6 cm. long.

a. Leaves densely white-tomentose beneath, finely crenate-serrate, and with sharp-acuminate tips: calyx glandular-puberulent.

150. S. FULGENS, Cav. Leaves cordate-ovate. — Ic. i. 15, t. 23; Sweet, Brit. Fl. Gard. ser. 2, i. t. 59; Lindl. Bot. Reg. xvi. t. 1356; Benth. l. c. 333; Hemsl. l. c. 556; Briq. l. c. *S. cardinalis*, HBK. l. c. 300, t. 152. *S. grandiflora*, Sessé & Moc. l. c. 7. — Central Mexico. ZACATECAS, on the Sierra de los Morones, near Plateado, Sept. 1, 1897 (*J. N. Rose*, no. 2743): JALISCO, between San Sebastian and the sum-

mit of Mt. Bufa de Mascota, alt. 2,150 to 2,300 m., March 20, 1897 (*E. W. Nelson*, no. 4093): MICHOACAN, Tlalpujahua (*Graham*): MEXICO, Toluca (*Andrieux*, no. 144); Désierto Viejo, Sept. 7, 1865, and San Nicolas, Oct. 26, 1865 (*Bourgeau*, nos. 853, 1106); Valley of Mexico (*Schaffner*, no. 396); cool forests, Sierra de las Cruces, alt. 3,230 m., Aug., 1892 (*C. G. Pringle*, no. 4227); Amecameca, Feb. 3, 1893 (*E. W. Nelson*, no. 6); foothills, Mt. Ixtaccihautl, Jan. 5, 1899 (*C. C. Deam*, no. 124): MORELOS, Serrania de Ajusco, alt. 2,460 m., May 26, 1898 (*C. G. Pringle*, no. 6862).

Var. BOUCHEANA, Benth. l. c. 334. Leaves narrowly deltoid-ovate, truncate or subcordate at base. — *S. Boucheana*, Kunth, Ind. Sem. Hort. Berol. 1845. — MICHOACAN, Tlalpujahua (*Graham*): PUEBLA, calcareous hills near Tehuacan, Aug. 30, 1897 (*C. G. Pringle*, no. 7449).

b. **Leaves merely pilose on the nerves beneath, coarsely crenate, and with blunt tips: calyx not at all or very minutely glandular-puberulent.**

151. **S. orizabensis.** Branches short-pilose with recurved hairs, minutely glandular above: leaves ovate, thin, minutely pilose above, 4 to 8 cm. long; the base subcordate with a short acumination at the junction with the slender retrorse-pilose petiole: raceme 1 dm. or so long; verticels 4–10-flowered, all remote, the lowest 4 to 5 cm. apart: bracts ovate-lanceolate, acuminate: pedicels 3 to 5 mm. long, sordid-viscid: calyx in anthesis 1.5 to 1.75 cm. long, slightly pilose on the nerves; the tube nearly twice exceeding the ovate bluntish lobes; upper lip entire: corolla-tube glabrate, twice exceeding the calyx; galea, long-bearded, equalling the lip: style somewhat bearded. — VERA CRUZ, Mt. Orizaba (*Botteri*, no. 1168).

= = Corolla 2.5 to 2.75 cm. long.

152. **S. adenophora.** Shrub ("sarmentose" according to Smith) with brown bark; the branches glandular-pilose: leaves cordate-ovate, acuminate (rarely blunt), crenate-serrate, green and sparingly pubescent above, more or less white tomentose beneath, 4 to 10 cm. long, on slender petioles 3 cm. or less in length: racemes 3 dm. or less in length; the rhachis very glandular-hairy; verticels 6–20-flowered, all remote, the lowest 2 to 3 cm. apart: bracts ovate, glandular, caducous: pedicels 6mm. or less in length, glandular: calyx campanulate, very glandular, in anthesis 8 to 10 mm. long, the tube twice exceeding the broad ovate mucronate or short-acuminate lobes; upper lip entire: corolla glandular-pilose, the tube once and a half longer than the calyx; galea and lip subequal: style bearded. — OAXACA, Jayacatlan, alt. 1,230 m., Sept. 11,

1894, and Nov. 17, 1895 (*L. C. Smith*, nos. 168, 875) ; between Tlapancingo and Tlalixtaquilla, GUERRO, alt. 1,600 to 1,230 m., Dec. 9, 1895 (*E. W. Nelson*, no. 2093, in part) ; El Parián-Etla, alt. 1,200 m., Nov., 1898 (*V. González* & *C. Conzatti*, no. 900).

= = = Related to the above, but not identified, is

153. S. LINEATA, Benth. Lab. 724, with the branches pubescent in lines, obtuse leaves slightly pubescent, truncate at base, and with the flowers somewhat smaller than in *S. fulgens*, in 4–6-flowered verticels.

+ + Leaves glabrous beneath.

++ Calyx herbaceous ; the tube becoming corrugated ; the 3 acuminate lobes large and subequal, long-ciliate on the margins.

154. S. PRINGLEI, Robinson & Greenman, Proc. Am. Acad. xxix. 391. — JALISCO, under cliffs, barranca of Tequila, Oct. 2, 1893 (*C. G. Pringle*, no. 4564).

++ ++ Calyx less herbaceous ; the tube sub-inflated, not corrugated ; the lobes unequal.

= Leaves cuneate at base.

155. S. INVOLUCRATA, Cav. Ic. ii. 3, t. 105; Lindl. Bot. Reg. xiv. t. 1205 ; Bot. Mag. t. 2872 ; Benth. l. c. 333 ; Hemsl. l. c. 558, in part ; Briq. l. c. *S. laevigata*, HBK. l. c. 295, t. 147. *S. Tonduzii*, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 157. — Southern Mexico and Central America. GUATEMALA, Coban, Dept. Alta Verapaz, alt. 1,320 m., Nov. 1886 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 345) ; Jumaytepeque, Dept. Santa Rosa, alt. 1,850 m., Jan., 1893 (*Heyde* & *Lux* in exsicc. J. D. Smith, no. 4397).

= = Leaves cordate-ovate.

a. Calyx in anthesis 0.6 to 1 cm. long.

156. S. PULCHELLA, DC. Cat. Hort. Monsp. 142 ; Colla, Hort. Ripul. 125, t. 16; Benth. l. c. 334; Hemsl. l. c. 563 ; Briq. in Engl. & Prantl, l. c. — Southern Mexico and Central America. CHIAPAS, without locality (*Ghiesbreght*, nos. 71, 758) ; near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895, and between San Cristobal and Teopisca, alt. 2,060 to 2,610 m., Dec. 4, 1895 (*E. W. Nelson*, nos. 3171, 3427) : GUATEMALA, Purulá, Dept. Baja Verapaz, alt. 1,540 m., Apr. 1887 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 1194).

b. Calyx in anthesis 1.5 to 2 cm. long.

157. **S. puberula.** Stem herbaceous, simple, 8 dm. high, from a woody base, minutely cinereous-puberulent : leaves 7 to 10 cm. long,

acuminate, appressed-serrate quite to the base, dull and minutely puberulous above, pale and glabrous beneath, on slender puberulent petioles 4.5 cm. or less in length: raceme simple, 1.3 dm. long; the rhachis and pedicels glandular and sparingly pilose; verticels 6–10-flowered, all remote, the lowest 2.5 cm. apart: bracts caducous (not seen): calyx tubular-campanulate, slightly pilose on the nerves; the lobes setaceous-acuminate, the upper lip twice exceeding the 2-lobed lower one, and twice exceeded by the tube: corolla 3 to 4 cm. long, the moderately ventricose glabrous tube twice as long as the calyx; the pilose galea equalling the lip: style bearded. — *S. involucrata*, Hemsl. l. c. 558, in part, not Cav. — San Luis Potosi, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 755).

* * * Stoloniferous herb; the subdeltoid or cordiform leaves confined chiefly to the lower half: peduncle elongated, simple; verticels 2–6-flowered, remote: corolla 5 cm. long.

158. S. stolonifera, Benth. Pl. Hartw. 70, & in DC. l. c. 333; Hemsl. 565; Briq. l. c. — Oaxaca, Sierra de San Felipe, alt. 2,300 to 3,080 m., June 23, 1894 (*C. G. Pringle*, no. 4705, *E. W. Nelson*, no. 1183); Telixtlahuaca, alt. 2,300 m., July 27, 1895 (*L. C. Smith*, no. 477).

D. Cyaneae, Benth. Calyx tubulose-campanulate: corolla blue violet or rose, straight; the tube ventricose.

* Corolla rose or rose-purple.

– Leaves hispid or pilose beneath.

– – Leaves rounded-cuneate at base: corolla 1.5 to 1.8 cm. long.

159. S. purpurascens, Mart. & Gal. l. c. 69; Benth. in DC. l. c. 335; Hemsl. l. c. 564; Briq. l. c. 283. — Described from Mt. Orizaba, Vera Cruz. Not seen.

– – – Leaves cordate at base.

= Verticels 6-flowered: calyx 1.3 cm. long: corolla 3 cm. long.

160. S. iodochroa, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 161. — Described from Costa Rica. Not seen.

= = Verticels 10–30-flowered: mature calyx 8 mm. long: corolla 1.5 cm. long.

161. **S. irazuensis.** Tall and freely branching, the stem purple, slightly crisp-pilose in lines, or glabrate; the branchlets glandular-pilose: internodes long (1 dm.): leaves cordate-ovate, acuminate, serrate, the

larger 5 to 6 cm. long, green and glabrate above, pale and appressed-pilose on the nerves beneath: racemes elongated, 3 to 4 dm. or less long; verticels all remote: pedicels becoming 6 to 8 mm. long, glandular-pilose: calyx puberulent, short pilose on the nerves; the upper lip ovate, short-acuminate, one half as long as the tube, the lower lip with 2 lance-ovate setaceous-acuminate lobes: corolla-tube once and a half longer than the calyx; the pilose galea shorter than the lip: style bearded. — *S. tiliaefolia*, Donnell Smith, l. c. v. 71, in part, not Vahl. — COSTA RICA, Volcan Irazu, Prov. Cartago, alt. 3,000 m., Mar., 1894 (*J. Donnell Smith*, no. 4920). Near the last species, but with much smaller flowers, in denser verticels.

+ + Leaves glabrous or merely puberulent beneath, rounded or subcordate at base: corolla 1.3 to 2.5 cm. long.

162. S. MARTENSII, Gal. Bull. Acad. Brux. l. c. 77; Benth. l. c.; Hemsl. l. c. 560; Briq. l. c., & in Engl. & Prantl, l. c. *S. membranacea*, var. *villosa*, Benth. Lab. 720. *S. villosula*, Benth. in DC. l. c.; Briq. Ann. Conserv. Jard. Bot. Genève, ii. 160. — Southern Mexico. OAXACA, Sierra de San Felipe, alt. 3,170 m., Aug. 8, 1894 (*C. G. Pringle*, no. 4772), alt. 2,920 to 3,380 m., 1894 (*E. W. Nelson*, no. 1100), alt. 3,000 m., Nov. 14, 1897 (*C. Conzatti* and *V. González*, no. 539): CHIAPAS, among the mountains (*Ghiesbreght*, no. 742). Ghiesbreght's plant with rounded, not subcordate leaf-bases and corolla only 1.3 cm. long, probably represents *S. villosula* which Briquet maintains at least as a subspecies.

* * Corolla blue or violet.

+ Leaves cuneate or narrowed at base.

++ Leaves lanceolate or oblong-lanceolate.

= Leaves oblong-lanceolate, acuminate, crenate-serrate, more or less pubescent beneath: corolla-tube and galea white; lip dark blue.

163. S. ALBO-CAERULEA, Linden, Belg. Hort. vii. 199, & Gartenfl. vii. 55, 97, t. 221; Hemsl. l. c. iv. 80. — South-central Mexico. MORELOS, wet mountain cañon above Cuernavaca, alt. 2,000 m., May 15, 1898, Feb. 15, 1899 (*C. G. Pringle*, nos. 7615, 8020), distributed under an unpublished manuscript name. Originally from MICHOACAN.

= = Leaves elliptic-lanceolate, caudate-acuminate, sharply dentate-serrate, glabrous beneath: corolla violet-purple.

164. S. PANSAMALENSIS, Donnell Smith, Bot. Gaz. xxiii. 249. — GUATEMALA, Pansamalá, Dept. Alta Verapaz, alt. 1,230 m., June, 1886 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 933).

++ ++ Leaves ovate or ovate-oblong, crenate-serrate: corolla deep blue.

= Leaves thin, glabrous beneath: raceme slender, lax; the remote verticels 2–8-flowered: lower lip of calyx entire.

165. S. PHAENOSTEMMA, Donnell Smith, l. c. 13. — GUATEMALA, between Rodes and Malacate, Dept. San Márcos, alt. 430 to 1,080 m., Jan. 31, 1896 (*E. W. Nelson*, no. 3736).

= = Leaves tomentulose beneath: raceme rather dense, the verticels many-flowered: lower lip of calyx 2-lobed.

a. Bracts ovate-acuminate, herbaceous, cinereous-pubescent, 8 mm. or less in length: corolla-tube glabrous; galea short-pilose.

166. S. MEXICANA, L. Racemes becoming lax, 4 dm. or less long: calyx cinereous-pubescent on the nerves, in anthesis 1.5 cm. long. — Sp. 23; Cav. Ic. i. 16, t. 25; Benth. in DC. l. c. 337; Hemsl. l. c. ii. 561; Briq. in Engl. & Prantl, l. c. *S. melissifolia*, Desf. Cat. Hort. Par. Ed. 3, 94. *Jungia altissima*, Moench, Meth. 379. *Sclarea mexicana*, Dill. Hort. Elth. 339, t. 254, f. 330. — Central Mexico. Without locality (*Coulter*, no. 1100): GUANAJUATO, 1880 (A. Dugès): ZACATECAS, near Monte Escobedo, Apr. 26, 1897 (*J. N. Rose*, no. 2635): MEXICO, Tokobaya, Aug. 10, 1865 (*Bilimek*, no. 308); Valley of Mexico, July 21, 1865, and Aug. 1, 1865 (*Bourgeau*, nos. 993, 619), Sept. 19, 1889 (*C. G. Pringle*, no. 2824); Rio Hondo Cañon, 1890 (*C. G. Pringle*, no. 3157).

Var. MAJOR, Benth. l. c. Similar but with glabrate calyx. — *S. papilionacea*, Cav. Ic. iv. 9, t. 319. *S. nitidifolia*, Ort. Dec. 53. — Without locality (*Coulter*, no. 1101): MEXICO, near City of Mexico (*Graham*).

Var. MINOR, Benth. l. c. Racemes shorter: calyx pubescent, in anthesis 0.9 to 1.3 cm. long. — *Ocimum micranthum*, Wats. Proc. Am. Acad. xxi. 435, not Willd. — Extending further north than the species. CHIHUAHUA, Frayles, 1885 (*Edw. Palmer* no. 290): near BATOPILAS, alt. 1,690 to 2,000 m., Oct. 4–5, 1898 (*E. A. Goldman*, no. 205): SAN LUIS POTOSI, near Morales, 1876 (*Schaffner*, no. 677); without locality, 1878 (*Parry & Palmer*, nos. 757, 758): ZACATECAS, Plateado, Sept. 3, 1897 (*J. N. Rose*, no. 3638): MEXICO, Toluca (*Andrieux*, no. 148); San Angel, May 31, 1866 (*Bourgeau*, no. 126); Amecameca, Jan. 5, 1899 (*C. C. Deam*); Tizapan, alt. 2,310 m., Sept. 23, 1899 (*C. G. Pringle*, no. 7936).

b. Bracts oblong-ovate, acuminate, membranaceous, veiny, glabrate, 2 cm. long: corolla long-pilose.

167. **S. lupulina.** Stems cinereous-puberulent: leaves ovate or

rhombic-ovate, acuminate at tip, rounded-cuneate at base, about 1 dm. long, appressed-serrate, green and sparingly puberulent above, canescent-puberulent beneath, on slender canescent petioles 8 cm. or less in length: racemes in bud resembling the fruit of the hop (*Humulus lupulus*); the membranaceous veiny bracts caducous: racemes becoming 1.5 dm. long; the verticels 10–many-flowered, the lowest a little remote: pedicels 1 cm. or less long, puberulent: calyx hispidulous at base, glabrate above, violet-tinged, in anthesis 1.3 to 1.7 cm. long; the tube 3 or 4 times exceeding the lobes; upper lip broad-ovate, short-acuminate, entire, lower with 2 narrower acuminate lobes: corolla 3 to 4.5 cm. long, the tube once to once and a half longer than the calyx; galea slightly exceeding the lip: style exserted, densely bearded. — Oaxaca, mountains of San Juan del Estado, alt. 2,310 m., Sept. 11, 1894 (*L. C. Smith*, no. 167); near Tlapancingo, alt. 1,850 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, no. 2068).

+ + Leaves round round-truncate or cordate at base.

++ Leaves glabrous beneath.

= Bracts somewhat persistent, lasting through anthesis: calyx in anthesis 2 cm. long: corolla 5 cm. long, violet.

168. S. ianthina, Otto & Dietr. Allgem. Gartenz. xv. 362; Decaisne, Fl. des Serres, ix. 73, t. 884. — Habitat unknown, supposed to come from Mexico or Peru.

= = Bracts caducous.

a. Calyx villous.

1. Corolla violet, 3.75 to 5 cm. long, three or four times exceeding the calyx: leaves thin, long-acuminate, glandular-punctate.

169. S. recurva, Benth. in DC. l. c. 336; Hemsl. l. c. 564; Briq. l. c. — Chiapas, very rare in the forests (*Ghiesbreght*, nos. 24, 756). Originally collected in the Sierra de San Pedro Nolesco.

2. Corolla twice as long as the calyx.

170. S. concolor, Lamb. in Benth. Lab. 297; Benth. in DC. l. c.; Hemsl. l. c. 555. — Described from "Mexico."

b. Calyx glabrate, with acuminate-attenuate lobes: corolla 2.5 cm. long, thrice exceeding the calyx.

171. S. glabrata, HBK. l. c. 299; Benth. l. c.; Hemsl. l. c. 556; Briq. l c. — Described from Venezuela, but reported from "Mexico" by Benth. l. c.

++ ++ Leaves pubescent beneath.

= Stem glandular-setulose : leaves setulose-hispid above, coarsely and irregularly serrate : calyx setulose-hispid : corolla barely 2 cm. long.

172. S. BISERRATA, Mart. & Gal. l. c. 66 ; Benth. l. c. 335 ; Hemsl. l. c. 553 ; Briq. l. c. — CHIAPAS (*Ghiesbreght*, no. 763). Described from Mt. Orizaba.

= = Stem villous above, glabrate below : leaves minutely pubescent above, finely and regularly crenate-serrate : calyx pilose : corolla 2.5 to 3 cm. long.

173. S. CYANEA, Benth. Lab. 296, & in DC. l. c. 336 ; Hemsl. l. c. 555. *S. cyaniflora*, Dietr. in Otto & Dietr. l. c. i. 301. *S. cyanifera*, Otto in Benth. l. c. as syn. — Central Mexico. MEXICO, Désierto Viejo, Sept. 7, 1865 (*Bourgeau*, no. 837).

E. Tubiflorae, Benth. Shrubs (rarely herbs) with tubulose-campanulate calyx : corolla scarlet crimson flesh-colored or purple, rarely blue-violet ; the tube straight or curved, cylindric or ampliate (not ventricose) above.

* Leaves cuneate or narrowed at base. (Forms of *S. cinnabarina*, *elegans*, and *nervata* may be looked for here.)

+ Leaves pubescent beneath, corolla rose-purple.

++ Leaves softly canescent-tomentose or cinereous-pilose beneath.

= Calyx minutely pilose, in anthesis 9 to 10 mm. long ; the tube once and a half exceeding the ovate-lanceolate acuminate lobes : corolla 2.5 to 4 cm. long.

174. S. CURVIFLORA, Benth. Lab. 284, & in DC. l. c. 340 ; Hemsl. l. c. 555 ; Briq. l. c. — HIDALGO, Zimapan (*Coulter*, nos. 1088, 1089, 1090) : MICHOACAN, Tlalpujahua (*Graham*).

= = Calyx hispidulous : corolla 1.5 to 1.8 cm. long.

175. **S. chiapensis.** Fruticose (?), the tall simple branches puberulent below, pilose-hispid above : leaves thick, ovate or oblong-ovate, appressed-serrate, acuminate at tip, subcuneate at base, 5 to 12 cm. long, green and minutely pilose above, canescent and subvelutinous beneath, on puberulent petioles 3.5 cm. or less in length : raceme 3 to 4 dm. or less long ; the verticels 6–10-flowered, all becoming remote, the lowest 3 to 4 cm. apart : bracts oblong-ovate, acuminate, short-pubescent, 1.5 cm. or less in length, caducous : pedicels becoming 5 mm. long : calyx in anthesis 7 to 8 mm. long ; the tube nearly twice exceeding the ovate-lanceolote acuminate lobes : corolla-tube about twice exceeding the calyx ; the densely villous galea about equalling the lip : style bearded. — CHIAPAS, without locality (*Ghiesbreght*, nos. 57, 761) ; near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895 (*E. W. Nelson*, no. 3201).

= = = Calyx long-pilose : corolla 2.5 to 3 cm. long.

176. **S. venosa.** Herbaceous, with erect branches; stem hollow, strongly quadrangular, pilose: leaves thin, ovate or rhombic ovate, crenulate-serrate, short-acuminate at tip, rounded-cuneate at base, 3.5 to 8 cm. long, green and short-pilose above, conspicuously veiny and cinereous-pilose beneath; the upper most often sessile, the others on slender pilose petioles 2.5 cm. or less in length: racemes 0.6 to 1.2 dm. long; the rhachis white-pilose, densely so in the axils; verticels 2–8-flowered, all remote, the lowest 1 to 2 cm. apart: pedicels filiform, white-pilose, becoming 5 mm. long: calyx in anthesis 7 mm. long; the tube thrice exceeding the ovate short-acuminate lobes: corolla villous; the tube twice longer than the calyx; the galea 5 mm. long, arcuate-cucullate above the short lip: style bearded. — CHIAPAS, on plains, Aug. (*Ghiesbreght*, no. 749); near San Cristobal, alt. 2,150 to 2,460 m., Sept. 18, 1895 (*E. W. Nelson*, no. 3138).

+ + Shrub with oblong-lanceolate leaves green and sparingly pilose beneath: rhachis and calyx glandular-pilose; the upper calyx-lip 3-dentate, the middle tooth filiform-appendiculate: corolla 1.5 cm. long.

177. S. ANTENNIFERA, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 168. — Described from CHIAPAS. Not seen.

+ + Leaves glabrous beneath or merely puberulent on the nerves.

++ Leaves ovate: corolla scarlet or carmine.

178. S. TUBIFERA, Cav. Ic. i. 16, t. 25; Lindl. Bot. Reg. xxvii. t. 44; Benth. l. c. 341; Hemsl. l. c. 566; Briq. in Engl. & Prantl. l. c. *S. longiflora*, Willd. Spec. i. 141. — Described from Mexico. Not seen.

++ ++ Leaves oblong, 2 cm. long: corolla blue-violet.

179. S. ZACUALPENSIS, Briq. Ann. Conserv. Jard. Bot. Genève, ii. 166. — Described from CHIAPAS. Not seen.

++ ++ ++ Leaves oblong-lanceolate, 1.5 to 2 dm. long.

= Verticels 2-flowered: calyx 1.7 cm. long: corolla crimson-violet.

180. S. BELLA, Briq. l. c. 169. — Described from COSTA RICA. Not seen.

= = Verticels 4–6-flowered: calyx in anthesis 9 mm. long: corolla vermilion.

181. **S. miniata.** Glabrate shrub: branches very slender, deeply furrowed: leaves thin, minutely puberulent on the nerves above, otherwise glabrous, long-acuminate at both ends, sharply serrate; petioles 1 to 2 cm. long: peduncle 1 dm. long; raceme slightly longer; verticels

remote, the lowest 3 to 4 cm. apart: pedicels puberulent, 3 mm. long: calyx minutely puberulent or glabrate; the tube thrice longer than the lips; upper lip broad-ovate, blunt or short-mucronate, lower with two short incurved subulate teeth: corolla 3 to 3.25 cm. long, slightly curved, short-pilose; the tube twice longer than the calyx; the galea and lip subequal: style glabrous or very slightly bearded. — CHIAPAS, in the forests, flowering in June (*Ghiesbreght*, no. 760).

* * Leaves rounded or cordate at base. (*S. curviflora* may be looked for here.)

\+ Leaves rounded or rounded-truncate at base, not definitely cordate.

++ Leaves lanceolate, 1 to 1.5 dm. long.

182. **S. perlonga.** Shrub with pilose-hispid branches: leaves thick, with long-attenuate tips, crenulate-serrate, rugose and covered with short dense plush-like indumentum above, canescent-velutinous beneath, on canescent petioles 2 cm. or less long: racemes 1 to 2 dm. long; verticels 2–8-flowered, all remote; pedicels and rhachis sordid glandular-pilose: calyx purplish, glandular, pilose-hispidulous, in anthesis 1.3 cm. long, the tube twice exceeding the blunt ovate entire lips: corolla vermilion, 3 cm. long, the slightly ventricose tube twice exceeding the calyx; the minutely pilose lips subequal: style slightly bearded. — GUERRERO, northeast slope of Sierra Madre, near Chilpancingo, alt. 2,150 to 2,620 m., Dec. 24, 1894 (*E. W. Nelson*, no. 2186). Further material may show this to belong with the *Fulgentes*.

++ ++ Leaves ovate or ovate-lanceolate, shorter.

= Corolla purple rose-purple or flesh-colored.

a. Leaves glabrous or only minutely puberulent beneath, not pilose (except slightly so in var. of *S. purpurea*).

1. Branches canescent-velutinous: verticels 2-flowered.

183. S. GRACILIFLORA, Mart. & Gal. l. c. 75; Benth. l. c. 342; Hemsl. l. c. 557. — Described from Zacuapan. Not seen.

2. Branches slightly pilose, puberulent or glabrous: verticels several–many-flowered.

○ A pair of glands generally present at the base of the petiole: corolla slender, puberulent, 2 to 2.75 cm. long.

184. S. PURPUREA, Cav. Minutely puberulent or glabrous. — Ic. ii. 52, t. 166; Jacq. Hort. Schoenb. iii. 2, t. 253; Benth. l. c. 341; Hemsl. l. c. 564; Briq. l. c. *S. affinis*, Cham. & Schl. Linnaea, v. 99; Benth. l. c.; Hemsl. l. c. 552; Briq. l. c. — Southern Mexico and Central America. JALISCO, Bolaños (*Hartweg*, no. 161): MORELOS, Cuernavaca,

Nov. 14, 1865 (*Bourgeau*, no. 1244): Vera Cruz, region of Orizaba, without date (*Botteri*, no. 576), Oct. 2, 1866 (*Bourgeau*, no. 3162), Feb.–May, 1885 (*A. Gray*), March 10, 1894 (*E. W. Nelson*, no. 189): Jalapa, alt. 1,230 to 1,380 m., Jan., 1894 (*C. L. Smith*, no. 1781): Oaxaca, near Oaxaca, alt. 1,600 to 2,090 m., Oct. 2, 1894, and near Tlapancingo, alt. 1,850 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, nos. 1501, 2087); Sierra de San Felipe, alt. 2,000 m., Sept. 23, 1895 (*C. Conzatti*, no. 717): Chiapas, without locality (*Ghiesbreght*, no. 128); near Yajalon, Nov. 21, 1895, between San Cristobal and Teopisca, alt. 2,060 to 2,610 m., Dec. 4, 1895, and valley of Comitan, alt. 1,780 to 2,000 m., Dec. 8, 1895 (*E. W. Nelson*, nos. 3401, 3478, 3484): Guatemala, Coban, Dept. Alta Verapaz, alt. 1,320 m., Nov., 1886 (*H. von Tuerckheim* in exsicc. J. D. Smith, no. 500); Castillas, Dept. Santa Rosa, alt. 1,230 m., Jan., 1893 (*Heyde & Lux* in exsicc. J. D. Smith, no. 4398): Costa Rica (*Oersted*).

Var. pubens, Gray. Stems and leaves slightly pilose. — Proc. Am. Acad. xxii. 446. — Jalisco, deep ravines and shaded hillsides, Rio Blanco, Oct., 1886 (*Edw. Palmer*, no. 662); near Guadalajara, Oct. 2, 1889 (*C. G. Pringle*, no. 2458).

○○ No glands at base of petiole: corolla hardly slender, villous, 2.5 to 4 cm. long.

185. S. Littae, Vis. Ill. Piant. Nuov. Ort. Padov. 15; Benth. l. c.; Hemsl. l. c. 560; Briq. l. c. — Oaxaca, near Oaxaca, alt. 2,300 to 2,930 m., Sept., 1894 (*E. W. Nelson*, no. 1342); Sierra de Clavellinas, alt. 2,770 m., Oct. 18, 1894 (*C. G. Pringle*, no. 4991); Rancho de Caciques, alt. 1,540 m., Sept. 5, 1895 (*L. C. Smith*, no. 698).

***b*. Leaves more or less pilose or tomentose beneath.**

1. Pubescence simple.

○ Leaves merely pilose beneath.

+ Leaves broad-ovate: corolla deep purple-violet.

186. **S. iodantha.** Stem 0.9 to 1.5 m. high, puberulent, much branched above: leaves short-acuminate, serrate, the larger ones 7 cm. long, 4.75 cm. broad, sparingly pubescent above, canescent beneath, slender-petioled: racemes long, rather loosely flowered, subsecund, 1 to 2 dm. long; verticels 6–10-flowered, all remote, the lowest 3 to 4 cm. apart: pedicels slender, about equalling the calyx: calyx in anthesis 5 mm. long, slightly hispid on the nerves and glandular-dotted; lobes very short, broad-ovate, mucronate-acuminate: corolla villous, 2 cm.

long; the galea exceeding the drooping lip: stamens and style exserted, glabrous. — MORELOS, mountain side above Cuernavaca, alt. 707 m., Feb. 5, 1899 (*C. G. Pringle*, no. 8039).

++ Leaves ovate-lanceolate; corolla flesh-colored.

187. **S. michoacana.** Shrub 1.5 to 3 m. high, the branches puberulent: leaves 0.3 to 1.2 dm. long, 1 to 6 cm. broad, long-acuminate, minutely pilose or glabrate above, canescent or glabrate beneath, slender-petioled: racemes dense, 1.5 dm. or less long; the lower verticels often in the axils of the upper leaves: calyx in anthesis 4 mm. long, otherwise as in the last: corolla villous, slender, 2 to 2.5 cm. long; the galea exceeding the lip: stamens and style exserted, glabrous. — MICHOACAN, dry wooded hills near Patzcuaro, Nov. 12, 1890, and Nov. 24, 1891 (*C. G. Pringle*, nos. 3600, 3946): JALISCO, between San Sebastian and the summit of Mt. Bufa de Mascota, alt. 1,380 to 2,150 m., March 20, 1897 (*E. W. Nelson*, nos. 4102, 4104).

○○ Leaves velutinous or lanate beneath.

+ Leaves serrate: calyx setulose-hispid or glabrate, with short broad mucronate lobes.

188. S. NERVATA, Mart. & Gal. l. c. 77; Benth. l. c. 339; Hemsl. l. c. 561; Briq. l. c. *S. monochila*, Donnell Smith, Bot. Gaz. xxiii. 13. — Southern Mexico and adjacent Central America. GUATEMALA, Tondos Santos, Dept. Huehuetenango, alt. 3,080 m., Dec. 26, 1895 (*E. W. Nelson*, no. 3635). Originally from OAXACA. Capt. Smith distinguishes his *S. monochila* from *S. nervata* by its pubescent calyx and scarlet corolla. In the specimen of Nelson's no. 3635 at hand, however, the corolla is distinctly purple, not scarlet, and there seems little else to keep the two apart.

++ Leaves crenate: calyx glandular-villous; the lobes long-acuminate.

189. S. KARWINSKII, Benth. Lab. 725, & in DC. l. c. 345; Hemsl. l. c. 558; Briq. l. c. — Described from "Mexico." Not seen.

○○○ Of close affinity to the preceding but not identified is

190. S. EXCELSA, Benth. Bot. Reg. xxvii. Misc. 90, & in DC. l. c. 342, described from GUATEMALA and said to be near *S. tubifera* but with the 2–4-flowered verticels in an elongated loose raceme.

2. Pubescence stellate.

191. **S. Rosei.** Shrub with dark gray bark; branches canescent with minute stellate pubescence: leaves ovate, appressed-serrate, blunt or

acute, 3.5 to 6 cm. long, dull and sparingly puberulent above, closely canescent-puberulent beneath; petioles canescent, 2 cm. or less long: racemes simple, 1dm. or less in length; verticels 2–6-flowered: pedicels slender, 2 to 4 mm. long: calyx canescent, in anthesis 1.2 to 1.3 cm. long, the tube becoming corrugated at base, broadened above, twice exceeding the ovate-lanceolate acuminate subequal lobes: corolla 2.5 to 3 cm. long, purple-violet, villous, the tube twice exceeding the calyx; the lip one half as long as the galea: style long-exserted, villous. — JALISCO, between Colotlan and Bolaños, Sept. 8, 1897 (*J. N. Rose*, no. 2844).

= = Corolla scarlet or vermilion, without purple tinge.

a. Upper lip of calyx prolonged into a subulate awn, nearly or quite equalling the calyx-tube; lower lip with 2 short subulate teeth.

192. S. CINNABARINA, Mart. & Gal. l. c. 63; Benth. l. c.; Hemsl. l. c. 554; Briq. l. c., & Ann. Conserv. Jard. Bot. Genève, ii. 169 (including varieties). — Southern Mexico and Central America. OAXACA, near Oaxaca, alt. 2,310 to 2,920 m., Sept., 1894 (*E. W. Nelson*, no. 1345) Sierra de San Felipe, alt. 460 m., Oct. 5, 1894 (*C. G. Pringle*, no. 4947); San Juan del Estado, alt. 2,300 m., Nov. 4, 1894 (*L. C. Smith*, no. 273): CHIAPAS (*Ghiesbreght*, nos. 72, 757): GUATEMALA, San Miguel Uspantan, Dept. Quiché, alt. 1,850 m., Apr., 1892, and Buena Vista, Dept. Santa Rosa, alt. 1,700 m., Dec., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, nos. 3118, 4381).

b. Calyx-lips subequal.

1. Calyx-lobes subulate tipped.

193. S. ELEGANS, Vahl. Leaves mostly broad-ovate, subtruncate or rounded at base, rarely exceeding 7 cm. in length: rhachis and calyces sordid glandular-villous. — Enum. i. 238, 362; DC. l. c. 342; Hemsl. l. c. 555; Briq. in Engl. & Prantl, l. c. *S. incarnata*, Cav. Ann. Cienc. Nat. ii. 112; HBK. l.c. 293, t. 144; not Etling. *S. microculis*, Poir. Dict. vi. 614. *S. punicea*, Mart. & Gal. l. c. 65. *S. microcalyx*, Scheele, Linnaea, xxii. 589. *S. longiflora*, Sessé & Moc. l. c. 8. — Central and southern Mexico. Without locality (*Coulter*, no. 1097): GUANAJUATO, without locality, Dec., 1827 (*Berlandier*, no. 1319); oak woods (*Hartweg*, no. 162): QUERETARO, NOV. 13, 1827 (*Berlandier*, no. 1245): MEXICO, Santa Fé, July 24, 1865 (*Bourgeau*, no. 489); woods of Maromenas, Oct. 11, 1865 (*Bourgeau*, no. 1111); Valley of Mexico (*Schaffner*, no. 395); woods of Eslava, alt. 2,400 m., Jan. 31, 1899 (*C. G. Pringle*, no. 7711): MICHOACAN, Tlalpajahua

(*Graham*); rich cañons, hills near Patzcuaro, Dec. 22, 1891 (*C. G. Pringle*, no. 3981): VERA CRUZ, Mt. Orizaba (*Botteri*, no. 578), alt. 3,080 m., Aug. 5, 1891 (*Seaton*, no. 514); Cruz Verde, near Jalapa, alt. 2,130 m., 1894 (*C. L. Smith*, no. 1480): GUERRERO, near Chilpancingo, alt. 2,770 to 3,140 m., Dec. 24, 1894 (*E. W. Nelson*, no. 2245): OAXACA, Sierra de San Felipe, alt. 3,080 m., Aug. 8, 1894 (*C. G. Pringle*, no. 5779).

Var. **sonorensis.** Leaves long-acuminate, mostly cuneate at base, about 1 dm. long: rhachis and calyces pilose, only slightly glandular. — SONORA, Alamos, 1890 (*Edw. Palmer*, no. 292); Huehuerachi, alt. 1,230 m., Dec. 6, 1890 (*C. V. Hartman*, no. 312): damp cañon, Rincanardo Mts., Dec. 27, 1890 (*F. E. Lloyd*, no. 449): CHIHUAHUA, Hacienda San Miguel, 1885 (*Edw. Palmer*, no. 270); near Batopilas, alt. 1,690 to 2,000 m., Oct. 4, 5, 1898 (*E. A. Goldman*, no. 206).

2. Calyx-lobes not subulate-tipped.

○ Bracts 2 to 3 cm. long, persistent.

194. S. MOLLISSIMA, Mart. & Gal. l. c. 71; Benth. l. c. 342; Hemsl. l. c. 561. — Described from OAXACA. Not seen.

○○ Bracts smaller, deciduous.

195. S. COCCINEA, Juss. Stems canescent-puberulent. — Juss. ex. Murr. Comm. Gott. i. (1778) 86, t. i.; Benth. l. c.; Regel, Gartenfl. vii. t. 232; Morren, Belg. Hort. ix. t. 5; Gray, Syn. Fl. l. c. 368; Hemsl. l. c. 555; Briq. l. c. *S. rosea*, Vahl, l. c. 244. *S. glaucescens*, Pohl, Fl. Bras. Ic. ii. 136, t. 192. — Of broad range in the Southern United States, the West Indies, South America, and India, rare in Mexico. Reported by Benth. l. c. from Matamoros, TAMAULIPAS.

Var. PSEUDO-COCCINEA, Gray. Stems conspicuously hirsute. — Syn. Fl. l. c. *S. pseudo-coccinea*, Jacq. Coll. ii. 302, & Ic. Rar. ii. 2. t. 209; Hook. Bot. Mag. t. 2864; Benth. l. c.; Paxton, Fl. Gard. ii. t. 40; Briq. l. c. *S. ciliata*, Benth. Lab. 286. *S. Galeottii*, Mart., in Mart. & Gal. l. c. 75. — Central and southern Mexico and Central America. NUEVO LEON, Papagallas, Dec., 1852 (*Geo. Thurber*, no. 872); Guajuco, March, 1880 (*Edw. Palmer*, no. 1074): SAN LUIS POTOSI, near Tancanhuitz, alt. 370 m., May 1, 1898 (*E. W. Nelson*, no. 4376); OAXACA, Chiquihuitlan, alt. 1,230 m., Aug. 16, 1895 (*L. C. Smith*, no. 619): CHIAPAS (*Ghiesbreght*, no. 752); valley of Jiquipilas, alt. 675 to 820 m., Aug., 1895 (*E. W. Nelson*, no. 2942): YUCATAN, Chichen Itza, Jan. 18, 1895 (*C. F. Millspaugh*, no. 116); Izamal, 1895 (*G. F. Gaumer*, no. 453).

Var. **minima.** Low, subsimple, resembling the last, but the leaves very small, rarely exceeding 2 cm. in length, densely long-setulose above. — CHIAPAS, table-land about Ocuilapa, alt. 1,040 to 1,170 m., Aug. 21, 1895 (*E. W. Nelson*, no. 3062).

+– +– Leaves cordate. (*S. coccinea* may be looked for here.)

++ Corolla purple or flesh-colored: calyx in anthesis 2 to 2.5 cm. long, with elongate setiform tips to the lobes.

196. S. ARISTULATA, Mart. & Gal. l. c. 67; Benth. l. c. 340; Hemsl. l. c. 553, Briq. l. c. *S. longistyla*, Benth. l. c. 344; Hemsl. l. c. 560; Briq. l. c. — Southern Mexico. JALISCO, mountains near Lake Chapala, Dec. 16, 1889 (*C. G. Pringle*, no. 2421): OAXACA, Valley of Oaxaca, alt. 1,570 m., Nov. 14, 1894 (*L. C. Smith*, no. 306); near Tlapancingo, alt. 1,850 to 2,460 m., Dec. 7, 1894 (*E. W. Nelson*, no. 2085).

++ ++ Related to the above but of doubtful affinity is

197. S. OTTONIS, Lehm. in E. Otto, Hamb. Gartenz. vi. 350; Regel, Gartenfl. vii. 129, & Bot. Zeit. xi. 335.

++ ++ ++ Corolla scarlet or vermilion.

= Calyx in anthesis 1.75 to 2 cm. long.

a. Leaves white-tomentose beneath.

198. S. INCANA, Mart. & Gal. l. c. 68; Benth. l. c. 344; Hemsl. l. c. 558. — Described from PUEBLA. Not seen.

b. Leaves slightly pilose on the nerves beneath.

199. S. TUBIFORMIS, Link, Kl. & Otto, Ic. Rar. 70, t. 28; Benth. l. c. 334, under *S. rectiflora*. *S. rectiflora*, Hemsl. l. c. 564, in part, not Vis. — Described and figured from garden specimens. Perhaps native of Mexico.

= = Calyx in anthesis 1 cm. long.

200. **S. cyclophylla.** Shrub with dark brown bark; branches glandular-hispid: leaves from suborbicular to broad-ovate, rounded or bluntish at tip, crenate, 6 to 7 cm. across, minutely pilose above, more densely so beneath, all but the uppermost on slender petioles 3 to 4 cm. long: raceme 5 to 6 cm. long, the 4–8-flowered verticels 1.5 to 2 cm. apart: pedicels 3 mm. long, hirsute: calyx glandular-hirsute on the veins; the tube twice exceeding the lobes; upper lip suborbicular, blunt or mucronate, lower with ovate mucronate-acuminate lobes: corolla pilose, 2.5 to 2.75 cm. long; the tube once and a half longer than the calyx;

the short blunt galea equalling the lip: style barely exserted, bearded.—Between Tlapancingo, Oaxaca and Tlalixtaquilla, Guerrero, alt. 1,240 to 1,600 m., Dec. 9, 1894 (*E. W. Nelson*, no. 2093, in part.)

++ ++ ++ ++ Related to the above is

201. S. glumacea, HBK. l.c. 298, a very doubtful species probably of this group, the corolla, however, being unknown. Described from "New Spain."

F. Hastatae, Benth. Perennial herbs: leaves mostly or entirely basal, hastate or angulate-cordate: racemes simple or commonly branching, glutinous-villous: corolla blue; the tube ventricose, ampliate above.

* Calyx in anthesis 1.3 to 1.8 cm. long: corolla 4.5 to 6 cm. long: leaves from broad-hastate to rounded at base, pubescent on both faces.

202. S. patens, Cav. Ic. v. 33, t. 454; Lindl. Bot. Reg. xxv. t. 23; Hook. Bot. Mag. t. 3808; Paxton, Mag. vi. 1; Benth. l. c. 348; Planch. Fl. des Serres, v. t. 503; Hemsl. l. c. 562; Briq. l. c. 284. *S. grandiflora*, Née ex Cav. l. c. *S. spectabilis*, HBK. l.c. 304. *S. macrantha*, Schl. Ind. Sem. Hort. Hal. 1841. *S. decipiens*, Mart. & Gal. l.c. 64. *S. staminea*, Mart. & Gal. l.c. 65. *S. glutinosa*, Sessé & Moc. l. c. 7, not L.—Central Mexico. Without locality (*Coulter*, no. 1102): San Luis Potosi, mountains of San Miguelito, 1876 (*Schaffner*, no. 676); without locality, alt. 1,850 to 2,460 m., 1876 (*Parry & Palmer*, no. 759): Guanajuato, rocky hillsides, Guanajuato, Aug., 1894 (*A. Dugès*, no. 228).

** Calyx in anthesis 5 to 8 mm. long.

+ Leaves villous beneath; the margins crenate.

++ Calyx-lobes elongated, subulate-aristate: leaves angulate-lobed.

203. S. vitifolia, Benth. Lab. 724, & in DC. l. c.; Hemsl. l. c. 566; Briq. l. c.—Southern Mexico. Vera Cruz, Maltrata, alt. 1,700 m., Aug. 16, 1891 (*Seaton*, no. 376): Oaxaca, Sierra de San Felipe, alt. 2,310 m., May 26, 1894 (*C. G. Pringle*, no. 4659), Sept. 1, 1894 (*E. W. Nelson*, no. 1169); San Juan del Estado, alt. 2,160 m., June 4, 1894 (*L. C. Smith*, no. 169); Cañada de San Gabriel, Etla, alt. 600 m., June 13, 1897 (*C. Conzatti*, no. 328).

++ ++ Calyx-lobes short-aristate: leaves generally slightly or not at all angulate-lobed.

204. S. cacaliaefolia, Benth. l. c.; Hemsl. l. c. 554; Briq. l. c.—Chiapas, in pine forests (*Ghiesbreght*, no. 754); near San Cristobal, alt. 2,160 to 2,700 m., Sept. 18, 1895 (*E. W. Nelson*, nos. 3230, 3236 *g*).

+ + Leaves short-pilose beneath; margins subentire.

205. **S. atriplicifolia.** Tall, 1 m. high: stem glandular-pilose, especially above, leafy nearly to the inflorescence: leaves broadly angulate-deltoid, acuminate, glabrate above, pale beneath, mostly 1 dm. long and broad, on pilose petioles 5 cm. or less in length: inflorescence paniculate, 2.5 to 3 dm. long; the verticels mostly 2-flowered, a little remote: bracts linear, glandular-hispid, 2 mm. long: pedicels 5 mm. long: calyx glandular-puberulent, with ciliate margins, in anthesis 5 mm. long, the ovate-lanceolate lobes with short-subulate tips; upper lip 2–3-dentate: corolla pilose, dark blue, 3 cm. long: style glabrous. — CHIAPAS, among the mountains, flowering in October (*Ghiesbreght*, no. 759).

Section IX. PYCNOSPHACE, Benth. Bracts imbricated. Calyx ovate; the upper lip tridentate, the lower bifid, all the teeth spinescent. Corolla-tube pilose-annulate within; the galea erect, emarginate-bifid; the lip with small lateral lobes, the larger middle one lacerate-fimbriate or dentate. Herbs with flowers in dense glomerules or verticels.

* Leaves deeply pinnatifid: verticels 1 or 2.

206. S. COLUMBARIAE, Benth. Lab. 302, & in DC. l. c. 349; Gray, Syn. Fl. l. c. 367; Briq. l. c. — Southwestern United States and adjacent Mexico. LOWER CALIFORNIA, San Quentin, 1889 (*Edw. Palmer*, no. 620).

* * Leaves crenate.

207. S. LEONIA, Benth. Lab. 303, & in DC. l. c.; Hemsl. l. c. 559; Briq. l. c. *Leonia salvifolia*, Llav. & Lex. Nov. Veg. Descr. fasc. 2, 6. — Described from "Santa Rosa."

Section X. HETEROSPHACE, Benth. Calyx tubulose, the upper lip truncate, tridentate. Corolla-tube pilose-annulate within or rarely subnaked; the galea short, erect, the lower lip with small somewhat spreading lateral lobes. Herbs with loose racemes of few-flowered verticels.

* Corolla scarlet: stems hirsute: leaves petioled, reniform-cordate, repand-toothed or pinnatifid.

208. S. ROEMERIANA, Scheele, Linnaea, xxii. 586; Torr. Bot. Mex. Bound. 132; Gray, Syn. Fl. l. c. 367; Hemsl. l. c. 564; Briq. l. c. 285. *S. porphyrantha*, Decne. Rev. Hort. ser. 4, iii. 301, t. 16; Planch. Fl. des Serres, xi. t. 1080. *S. porphyrata*, Hook. Bot. Mag. t. 4939. — Texas and adjacent Mexico. CHIHUAHUA, Sta. Eulalia Mts., March 27, 1885 (*C. G. Pringle*): COAHUILA, mountains near Saltillo, July, 1880

(*Edw. Palmer*, no. 1073): NUEVO LEON, limestone hills, near Monterey, July 16, 1889 (*C. G. Pringle*, no. 2869).

* * Corolla blue: stems lanate: leaves sessile, coarsely and pungently dentate.

209. S. CALIFORNICA, Brandegee, Proc. Cal. Acad., ser. 2, ii. 197.— LOWER CALIFORNIA, Calmalli, Cardon Grande, Apr. 23, 1889 (*T. S. Brandegee*).

INDEX TO THE NUMBERED SPECIMENS OF SALVIA CITED IN THIS PAPER.

(The first number indicates the specimen; the second, in parentheses, the number of the species in the preceding synopsis.)

Andrieux, 143 (135); 144 (150); 148 (166); 149 (105); 150 (93); 151 (111).
Anthony, 294 (97).
Berlandier, 1245 (193); 1279 (36); 1319 (193); 3186 (100).
Bilimek, 304 (118); 308 (166); 315 (63); 316 (63).
Botteri, 394 (1); 395 (11); 533 (11); 534 (53); 576 (184); 578 (193); 869 (11); 1168 (151).
Bourgeau, 122 (11); 125 (29, 118); 126 (166); 295 (103); 396 (31); 489 (193); 490 (28); 619 (166); 721 (63); 837 (173); 853 (150); 854 (63); 855 (98); 856 (142); 859 (51); 993 (166); 1106 (150); 1109 (53); 1110 (43); 1111 (193); 1238 (132); 1239 (7); 1244 (184); 1504 (3); 1591 (69); 2857 (69); 3162 (184); 3215 (19).
Conzatti, 163 (139); 328 (203); 717 (184).
Conzatti & González, 478 (26) 539 (162); 900 (152); 902 (112); 903 (106).
Coulter, 1088 (174); 1089 (174); 1090 (174); 1093 (138); 1097 (193); 1099 (136); 1100 (166); 1101 (166); 1102 (202); 1115 (31); 1118 (89); 1120 (91).
Deam, 2 (43); 57 (76); 124 (150); 139 (139).
Dugès, 228 (202); 228 A (89); 228 B (52).
Gaumer, 394 (3); 453 (195).
Ghiesbreght, 24 (169); 57 (175); 61 (41); 71 (156); 72 (192); 76 (137); 122 (148); 128 (184); 129 (60); 738 (43); 741 (43); 742 (162); 743 (60); 745 (19); 747 (43); 749 (176); 750 (41); 751 (29); 752 (195); 753 (137); 754 (204); 755 (148); 756 (169); 757 (192); 758 (156); 759 (205); 760 (181); 761 (175); 763 (172); 764 (110); 765 (130).
Goldman, 72 (69); 205 (166); 206 (193); 212 (138); 214 (114); 340 (82).
González, 42 (103).
Graham, 1096 (142).
Gregg, 322 (100); 335 (147); 340 (136); 406 (40); 541 (36); 542 (11); 597 (123).
Greene, 300 (100).
Hartman, 43 (102); 312 (193); 323 (24); 738 (141); 744 (36); 749 (11); 776 (37).
Hartweg, 159 (11); 160 (37); 161 (184); 162 (193); 163 (29); 164 (103); 165 (136); 171 (43).
Holway, 3028 (79); 3136 (139); 3184 (39).
Lamb, 311 (3); 317 (3); 351 (74); 355 (74); 395 (74); 621 (25).
Lemmon, 2861 (102).

Lloyd, 449 (193); 451 (115); 452 (24).
Millspaugh, 18 (8); 90 (3); 116 (195).
Nelson, 6 (150); 132 (67); 177 (67); 189 (184); 701 (43); 958 (13); 1100 (162); 1103 (118); 1169 (203); 1175 (63); 1183 (158); 1244 (130); 1289 (118); 1342 (185); 1345 (192); 1387 (50); 1448 (110); 1501 (184); 1511 (105); 1521 (135); 1587 (129); 1595 (104); 1782 (53); 1783 (110); 1794 (86); 1898 (103); 1915 (93); 1917 (136); 1972 (135); 2005 (116); 2049 (130); 2064 (55); 2068 (167); 2085 (196); 2086 (27); 2087 (184); 2091 (135); 2093 (152, 200); 2146 (55); 2186 (182); 2220 (55); 2235 (110); 2245 (193); 2300 (68); 2508 (148); 2668 (76); 2898 (128); 2922 (29); 2942 (195); 3062 (195); 3138 (176); 3142 (43); 3166 (137); 3171 (156); 3191 (41); 3201 (175); 3230 (204); 3236 g (204); 3374 (54); 3401 (184); 3427 (156); 3429 (130); 3478 (184); 3484 (184); 3507 (130); 3635 (188); 3736 (165); 4057 (107); 4072 (7); 4081 (107); 4093 (150); 4012 (187); 4103 (21); 4104 (187); 4171 (20); 4247 (66); 4376 (195); 4527 (100); 4557 (138); 4566 (52); 4651 (40); 4663 (136); 4679 (104); 4755 (138); 4807 (127); 4812 a (138); 4850 (46); 4969 (36); 6315 (141).
Palmer [1870], 7 (101).
Palmer [1880], 1062 (11); 1064 (94); 1067 (100); 1068 (100); 1069 (100); 1072 (94); 1073 (208); 1074 (195); 1079 (136); 1096 (70); 1097 (40); 1098 (40).
Palmer [1885], 64 (9); 96 (75) 154 (75); 157 (75); 205 (24); 259 (61); 270 (193); 290 (166); 379 (139).
Palmer [1886], 28 (83); 53 (30); 61 (33); 183 (121); 184 (120); 226 (29); 488 (75); 498 (7); 556 (44); 598 (59); 659 (53); 662 (184).
Palmer [1887], 320 (10).
Palmer [1889], 620 (206); 684 (97).
Palmer [1890], 10 (3); 292 (193); 345 (108); 680 (9); 681 (9); 682 (24); 878 (101).
Palmer [1892], 1964 (72).
Palmer [1895], 244 (3).
Palmer [1896], 305 (37); 327 (36); 404 (136); 417 (147); 446 (36); 451 (28); 572 (11); 757 (53); 844 (138); 967 (53).
Palmer [1898], 107 (100); 153 (147); 161 (138); 194 (94); 334 (38); 335 (11); 336 (36); 640 (142); 640½ (139); 726 (136); 1071 (147).
Parry, 26 (147); 29 (94).
Parry & Palmer, 698 (89); 729 (47); 730 (103); 731 (104); 736 (28); 740 (145); 741 (136); 743 (11); 744 (36); 745 (52); 746 (52); 746½ (11); 747 (138); 748 (138); 750 (98); 751 (96); 751½ (98); 752 (118); 753 (98); 754 (142); 755 (157); 756 (86); 757 (166); 758 (166); 759 (202); 760 (32); 761 (31).
Pringle, 52 (95); 239 (139); 556 (11); 637 (139); 654 (36); 659 (100); 1727 (7); 1764 (138); 1798 (75); 2297 (26); 2384 (136); 2421 (196); 2458 (184); 2463 (59); 2555 (83); 2560 (121); 2817 (118); 2818 (63); 2824 (166); 2869 (208); 2913 (30); 3058 (120); 3153 (118); 3157 (166); 3170 (98); 3206 (104); 3224 (63); 3273 (104); 3593 (107); 3600 (187); 3681 (40); 3683 (53); 3946 (187); 3954 (43); 3981 (193); 4097 (107); 4150 (39); 4155 (31); 4163 (29); 4200 (40); 4227 (150); 4258 (127); 4278 (51); 4298 (138); 4351 (109); 4564 (154); 4624 (44); 4659 (203); 4705 (158); 4763 (105); 4772 (162); 4845 (65); 4862 (130); 4947 (192); 4953 (63); 4960 (135); 4991 (185); 5176 (11); 5624 (26); 5643 (119); 5654 (146); 5779 (193); 6013 (110); 6240 (129); 6245 (92); 6251 (93);

6538 (104); 6850 (79); 6862 (150); 6905 (90); 6907 (98); 6914 (118); 7065 (135); 7078 (62); 7080 (135); 7449 (150); 7457 (51); 7548 (138); 7612 (122); 7615 (163); 7643 (84); 7711 (193); 7936 (166); 7991 (28); 8020 (163); 8035 (21); 8039 (186); 8222 (47).

Rose, 1609 (64); 1727 (35); 1934 (30); 2233 (45); 2338 (49); 2402 (138); 2601 (113); 2635 (166); 2641 (123); 2682 (62); 2743 (150); 2745 (29); 2804 (138); 2844 (191); 2862 (125); 3407 (88); 3534 (52); 3627 (123); 3638 (166).

Schaffner, 394 (139); 395 (193); 396 (150); 410 (43); 648 (89); 660 (138); 661 (142); 662 (139); 663 (98); 664 (98); 665 (136); 666 (145); 667 (143); 669 (123); 670 (100); 671 (104); 672 (29); 673 (36); 674 (11); 675 (53); 676 (202); 677 (166); 678 (85); 680 (52); 1053 (53).

Seaton, 259 (31); 260 (138); 304 (11); 323 (31); 376 (203); 431 (69); 500 (124); 514 (193).

C. L. Smith, 1480 (193); 1664 (26); 1749 (67); 1756 (67); 1781 (184).

J. D. Smith, 110 (118); 299 (26); 345 (155); 500 (184); 780 (54); 816 (11); 823 (43); 933 (164); 1090 (1); 1192 (118); 1193 (43); 1194 (156); 1911 (19); 2169 (148); 2187 (118); 2597 (19); 3014 (1); 3118 (192); 3128 (43); 3612 (128); 4047 (26); 4048 (18); 4050 (118); 4051 (17); 4052 (128); 4055 (11); 4056 (118); 4381 (192); 4394 (63); 4395 (43); 4397 (155); 4398 (184); 4399 (1); 4400 (19); 4401 (53); 4564 (118); 4919 (57); 4920 (161); 5422 (1); 5895 (16); 5900 (11); 5901 (1); 5902 (57).

L. C. Smith, 17 (129); 167 (167); 168 (152); 169 (203); 170 (135); 171 (118); 174 (7); 268 (53); 269 (26); 272 (110); 278 (192); 306 (196); 413 (105); 414 (52); 477 (158); 601 (43); 619 (195); 698 (185); 708 (13); 778 (40); 860 (110); 875 (152); 897 (129); 908 (63); 930 (103); 949 (11); 950 (130).

Thurber, 821 (36); 872 (195); 907 (76).

Tonduz, 701 (11); 1781 (57); 7158 (16); 7228 (26); 7280 (1); 8456 (11).

Uhde, 791 (118).

Valdez 31 (8); 55 (1).

C. Wright, 1524 (100).

W. G. Wright, 1298 (74).

Wislizenus, 152 (139).

II. — A REVISION OF THE MEXICAN AND CENTRAL AMERICAN SOLANUMS OF THE SUBSECTION TORVARIA.

Dunal's subsection *Torvaria* of the genus *Solanum* has never been understood in America. Almost without exception the many diverse forms from equally diverse regions have been in American herbaria placed under the type species *Solanum torvum*, Swartz. This treatment as a single polymorphous species of all the plants of similar subgeneric character, — a course by no means without precedent in other sections of *Solanum* and scores of other tropical American genera, — has been due to a lack of authentic material and of any more concise statement of the specific characters than can be found in the rather ponderous monograph of Dunal. An accumulation of specimens from many sources has made it possible to divide the Mexican material passing in the Gray Herbarium as *Solanum torvum* into species of marked morphological characters and restricted geographical ranges. Most of these plants thus separated are found to agree very well with the descriptions of different species recognized from Mexico by Dunal in his monograph, though three species there characterized have not yet been identified with modern herbarium material. Doubtless these identifications of modern Mexican specimens with the old descriptions cannot all be taken as final, and a study of the type specimens, when it is possible to examine them, may prove the present conclusions to be in some cases inaccurate. Yet confidence is felt that the present understanding of the group is much clearer than that which has prevailed among recent students of Mexican botany. With the hope of simplifying the future study of the group the following synopsis is presented of the Mexican species of the section as now interpreted.

* Pubescence of flowering branches densely stellate-tomentose, hairs short and fine.

← Pedicels bearing simple gland-tipped hairs among the stellate ones. (See also *S. ochraceo-ferrugineum*.)

S. TORVUM, Swartz. Branches slightly armed, canescent-ochraceous, the young parts, especially, ochraceous: leaves subcordate-ovate, shallowly sinuate-lobed, olive-green and stellate-scabrous above, canescent and stellate-tomentose beneath, 1 to 1.5 dm. long, 6 to 12 cm. broad, often sparingly armed on the midrib beneath, more rarely so above:

corymb generally bifid or trifid, many-flowered, cymose, the fruiting pedicels mostly ascending. — Prodr. 47; Dunal, Sol. 203, t. 23, & in DC. Prodr. xiii. 260. — Originally described from the West Indies, where it is common. In Mexico known only from the South. CHIAPAS, near Huehuetan, alt. 150 to 615 m., Feb. 22, 1896 (*E. W. Nelson*, no. 3830).

Var. RUBIGINOSUM, Dunal, l. c. 261, described from Guatemala, apparently differs from the species only in its more ferrugineous pubescence. — GUATEMALA, Rio Dulce, Depart. Livingston, March, 1889 (*J. Donnell Smith*, no. 1840): NICARAGUA (*C. Wright*).

S. HERNANDESII, Moc. & Sessé. More spiny throughout, the branches more loosely sordid-tomentose: leaves deeply and sinuately 5–7-lobed, the lobes sometimes pinnatifid: inflorescence at first subcorymbose, simple or bifid, becoming distinctly racemose: fruiting pedicels spreading. — Moc. & Sessé in Dunal, l. c. 266. — CHIAPAS, mountains near Tonala, alt. 600 to 1,050 m., Aug. 14, 1895, table land about Ocuilapa, alt. 1,050 to 1,170 m., Aug. 21, 1895 (*E. W. Nelson*, nos. 2904, 3029): GUATEMALA, San Miguel Uspantán, Depart. Quiché, alt. 1,850 m., April, 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 3446): NICARAGUA (*C. Wright*).

S. madrense. Shrubby, the young branches loosely stellate-tomentose with canescent or ochraceous hairs, and armed with straight or slightly curved prickles: leaves thick, ovate to ovate-lanceolate, acuminate, unequally subcordate at base, subentire or bluntly and shallowly sinuate-angulate, without the petiole (1 to 3 cm.) 5 to 15 cm. long, 4 to 13 cm. wide, above olive-green, stellate-scabrous, beneath a little paler and tomentulose, sometimes slightly armed; young leaves often aureate-tinged, and velutinous: inflorescences extra-axillary, in maturity 4 to 9 cm. long, simple or bifid, scorpoid-racemose; the pedicels glandular hairy, spreading and reflexed in fruit: calyx-lobes lanceolate, long-acuminate: corolla 2 cm. long, 3 cm. broad, whitish, deeply lobed, the lobes lanceolate or lance-ovate, acutish: filaments very short; anthers subequal, slender, 8 or 10 mm. long: the style somewhat longer: berry apparently black, glabrous, 1 to 1.5 cm. in diameter. — *S. diversifolium*, Wats. Proc. Am. Acad. xxi. 434, not Schl. *S. torvum*, Wats. l. c. xxii. 441, not Swartz. — The common representative of the group in the Sierra Madre and westward to the Pacific. SONORA, Sierra de los Alamos, March 25 to Apr. 8, 1890 (*Edw. Palmer*, nos. 363, 364): CHIHUAHUA, Hacienda San Miguel, 1885 (*Edw. Palmer*, no. 22): TEPIC, San Blas, June 6, 1897 (*E. W. Nelson*, no. 4335): SINALOA, Mazatlan,

Dec. 1894, and Isla Piedra, near Mazatlan, Dec. 31, 1894 (*Frank H. Lamb*, nos. 336, 336[a]); Rosario, June 20, 1897, and foothills of the Sierra Madre, near Colomas, July 20, 1897 (*J. N. Rose*, nos. 1402, 1777): JALISCO, barranca near Guadalajara, June, 1886 (*Edw. Palmer*, no. 106); near Guadalajara, Nov. 14, 1888, May 27, 1891 (*C. G. Pringle*, nos. 2193, 5140 [type]); mountains near Talpa, alt. 1,200 to 1,540 m., March 7, 1897, Maria Madre Isl., May 3–25, 1897 (*E. W. Nelson*, nos. 4040, 4185): COLIMA, Colima, Jan. 9–Feb. 6, 1891 (*Edw. Palmer*, no. 1179): GUERRERO, Acapulco, Nov. 1894 (*Edw. Palmer*, no. 148).

+– +– Pedicels not glandular.

+– Pubescence of branches and lower face of leaves whitish-lanate.

S. HARTWEGI, Benth. Essentially unarmed, branches rarely with a few spines: leaves from oblong-lanceolate to ovate, entire or sinuate-repand, acuminate, pale green above, the younger stellate-velutinous, the older scabrous: cymes many-flowered, the branches scorpoid; peduncles pedicels and calyx white-lanate; fruiting pedicels mostly erect: ripe fruit red, glabrous, 1 cm. or more in diameter. — Pl. Hartw. 68; Dunal, l. c. 262. *S. torvum*, var. *lanatum*, Dunal, l. c. 261. — Hartweg's original specimen was from Hacienda del Carmen. Dunal's variety was based upon a Guatemala specimen. The following are referred here: MEXICO, Valley of Mexico, Nov. 27, 1865 or 1866 (*Bourgeau*, no. 725): VERA CRUZ, Valley of Cordova, Jan. 16, 1865 or 1866 (*Bourgeau* no. 1671); region of Orizaba, May to July (*Bourgeau*, nos. 2408, 2556, *Botteri*, nos. 82, 1083, *Seaton*, no. 142); Santa Lucretia, Isthmus of Tehuantepec, Feb., 1895 (*C. L. Smith*, no. 1071): OAXACA, hills near Oaxaca, alt. 1,850 m., Sept. 8, 1894 (*C. G. Pringle*, no. 4891); Monte Alban, alt. 1,690 m., Nov. 24, 1894 (*L. C. Smith*, no. 341); near Totontepec, alt. 1,690 m., vicinity of Choapam, alt. 1,170 to 1,385 m., vicinity of Yalalag, alt. 1,230 to 2,400 m., July, 1894 (*E. W. Nelson*, nos. 788, 835, 952); Tillantongo, Dec. 12, 1895 (*Ed. Seler*, no. 1591): GUATEMALA, San Siguán, Depart. Quiché, alt. 1,785 m., May, 1892 (*Heyde & Lux* in exsicc. J. D. Smith, no. 3446): COSTA RICA, Cartago, Prov. Cartago, alt. 1,300 m., Nov., 1887 (*Juan J. Cooper* in exsicc. J. D. Smith, no. 5872). Palmer's no. 637 from San Luis Potosi, 1878, may be an attenuated form of this.

+– +– Pubescence ochraceous or fuscous.

= Branches more or less armed.

S. FENDLERI, Van Heurck & Müll. Arg. Sparingly armed: pubes-

cence of young branches leaves and calyx ochraceo-ferrugineous, pulverulent: leaves rhombic-ovate, shallowly sinuate-angled, 6 to 8 cm. long, 4 to 5.5 cm. broad: inflorescence closely flowered. — Van Heurck & Müll. Arg. in Van Heurck, Obs. 130. — PANAMA, Chagres, Feb., March, 1850 (*A. Fendler*, no. 254).

S. ochraceo-ferrugineum. Stems 1.5 to 3 m. high, armed with stout broad-based deltoid prickles: young branches leaves and calyces ochraceo-ferrugineous, densely velutinous-tomentose rarely a little glandular: leaves oblong-ovate, shallowly sinuate-angled or lobed, 7 to 16 cm. long, 4.5 to 12 cm. broad, paler and more tomentose beneath than above: inflorescence loosely many-flowered: calyx in anthesis 8 or 10 mm. long, deeply 5-parted into deltoid-lanceolate acuminate lobes: corolla 3 cm. broad: anthers slender, subequal, 6 or 7 mm. long: berries glabrous, 1 cm. or more in diameter. — *S. obtusifolium*, Benth. Pl. Hartw. 23, not HBK. *S. torvum*, var. *ochraceo-ferrugineum*, Dunal, l. c. 260. — GUANAJUATO, Guanajuato, 1837 (*Hartweg*, no. 204), 1880, 1883 (*A. Dugès*): TAMAULIPAS, San Luis Potosi to Tampico, Dec., 1878 to Feb., 1879 (*Edw. Palmer*, no. 639½); VERA CRUZ, old fields and recently cleared grounds, Wartenburg, near Tantoyuca, 1858 (*Ervendberg*, nos. 285, 485).

S. DIVERSIFOLIUM, Schlecht. Sparingly armed: branches petioles and inflorescences cinereous stellate-tomentulose: leaves oblong-ovate, bluntly acuminate, with rounded bases, olive-green and stellate-scabrous above, cinereous-tomentulose or pulverulent beneath, 7 to 20 cm. long, 4 to 12 cm. broad, subentire or slightly undulate, rarely shallowly sinuate: inflorescence subaxillary, simple or branched, becoming 6 to 9 cm. long, extremely floriferous, the pedicels after anthesis mostly strongly reflexed or drooping. — Linnaea, xix. 297; Dunal, l. c 262. — Originally described from Papantla, VERA CRUZ. The following are referred here; Mexico, without locality (*Coulter*, no. 1245): SAN LUIS POTOSI, hills, Las Canoas, Aug. 21, 1891 (*C. G. Pringle*, no. 3901, doubtfully referred here): VERA CRUZ, Valley of Cordova, Dec. 26, 1865 or 1866 (*Bourgeau*, no. 1608); Orizaba (*Botteri*); near Motzorongo, Feb. 22, 1894 (*E. W. Nelson*, no. 149): OAXACA, Paso de Canoa, Tuxtepec, alt. 150 m., Aug. 28, 1895 (*Conzatti*, no. 133, *L. C. Smith* no. 669).

= = Branches unarmed.

S. Hayesii. A small tree: the young branches finely but densely invested with short ochraceo-cinereous stellate hairs: upper leaves geminate and unequal, ovate to ovate-oblong, acuminate, unequal and sub-

cordate or rounded at base, entire or slightly undulate, the larger 1.7 to 2.4 dm. long, 1.1 to 1.4 dm. wide, at first stellate-pubescent above, soon quite glabrous and lucid, cinereous-tomentose beneath; primary nerves 5 to 7 pairs; petioles thick, 2 to 4 cm. long: inflorescence extra-axillary, bifid or trifid, becoming 6 or 8 cm. long, the branches scorpoid-racemose, densely flowered, ochraceo-cinereous; pedicels in fruit becoming strongly deflexed: calyx in anthesis 2 mm. long, with short rounded lobes: corolla densely stellate without, 6 or 7 mm. high, barely 1 cm. broad, with long lanceolate lobes: anthers subequal, lanceolate, truncate, 3 or 4 mm. long: style slightly longer, sparingly stellate-pubescent: berry glabrous or sparingly puberulent, 1 cm. or more in diameter. — PANAMA, Chagres, Jan., 1850 (*A. Fendler*, no. 246); near Gatun, Dec., 1859 (*Sutton Hayes*).

*** * Short stellate pubescence of flowering branches mixed with long slender naked hairs.**

S. erythrotrichum. Strongly armed with deltoid mostly hooked stout prickles: branches densely reddish-tomentose with appressed stellate hairs and longer naked jointed trichomes: leaves oblong, acuminate, rounded at the base, subentire, 1 to 1.7 dm. long, 3 to 8 cm. wide, ferrugineous-green sparingly stellate and strongly rugose above, tomentulose beneath, at first rufescent, later cinereous, rarely armed on the midrib beneath; primary nerves 5 to 7 pairs; petiole 1.5 to 2.5 cm. long, rufescent: peduncle extra-axillary, 3.5 cm. long, few-flowered, rufescent; pedicels short (7 mm.), thickish: calyx in fruit deeply cut into lanceolate lobes 6 or 7 mm. long: fruit puberulent, becoming glabrate, about 1 cm. in diameter. — GUATEMALA, Coban, Depart. Alta Verapaz, alt. 1,325 m., Feb., 1888 (*H. von Tuerckheim* in exsicc. J. D. Smith no. 1381).

*** * * Branches clothed with long stellate-tipped hairs with broad bases.**

S. HISPIDUM, Pers. Armed with long stout hooked-prickles, and densely pubescent with ochraceous or fuscous distinct stiff trichomes: leaves ovate, subcordate or attenuate at base, 0.5 to 2 dm. long, subentire or with 5 to 11 sinuate lobes; above ferrugineous with distinct stipitate stellate hairs, or glabrate, and often with long sharp prickles on the nerves; beneath cinereous with similar hairs, the nerves often spiny. — Syn. i. 228; Dunal, l. c. 275. *S. stellatum*, Ruiz & Pav. Fl. Per. ii. 40, t. 176. *S. chrysotrichum*, Schlecht. Linnaea, xix. 304; Dunal, l. c. 276. — From the variable material now at hand it seems impossible to

keep *S. chrysotrichum* separate from Persoon's species. VERA CRUZ, Cordoba, alt. 830 m., Aug. 20, 1891 (*H. E. Seaton*, no. 395); Jico, July 16, 1893 (*E. W. Nelson*, no. 24): Orizaba, Jan. 28, 1894 (*E. W. Nelson*, no. 45): OAXACA, Calderon, alt. 1,850 m., San Juan del Estado, June 18, 1894 (*L. C. Smith*, no. 36); near Reyes, alt. 1,785 to 2,060 m., Oct. 24, 1894 (*E. W. Nelson*, no. 1785): CHIAPAS, near Tumbala, alt. 1,230 to 1,690 m., Oct. 20, 1895 (*E. W. Nelson*, no. 3331): GUATEMALA, Santa Rosa, alt. 925 m., June, 1892, San Miguel Uspantán, alt. 1,850 m., Apr., 1892 (*Heyde & Lux* in exsicc. J. D. Smith, nos. 3441, 3448): COSTA RICA, Cartago, alt. 1,650 m., Dec., 1887 (*Juan J. Cooper*, in exsicc. J. D. Smith, no. 5870).

Three species of the subsection *Torvaria*, described from Mexico, are still obscure and perhaps not recently collected. These are *S. amictum*, Moric. in Dunal l. c. 263; *S. rude-pannum*, Dunal, l. c. 264; *S. Lamberti*, Dunal, l. c. 268.

III. — SOME UNDESCRIBED MEXICAN PHANEROGAMS CHIEFLY LABIATAE AND SOLANACEAE.

Pelexia Pringlei. Roots clustered, cylindric, whitish, tuberiform, 0.5 to 1 dm. long: leaves 3, at the base of the bracteate scape, long-petioled, with smooth entire oblong to ovate-lanceolate acuminate blades 8 to 12 cm. long, about 4 cm. wide: scape about 3 dm. high, sparingly pubescent above, with about 8 sheathing lanceolate bracts: spike 1 dm. long, rather loosely flowered: bracts lance-acuminate, 3 cm. long, much exceeding the ovary: sepals greenish, lanceolate, acuminate, two of them free and somewhat drooping, 2 cm. long, the others united to form a blunt galea; lip short and rounded, exceeded by the beak of the stigma; spur adnate to the ovary: anther ovate, bluntish, 5 m. long. —VERA CRUZ, wooded hills near Jalapa, alt. 1,230 m., April, 1899 (*C. G. Pringle*, no. 8122). Habitally resembling *P. setacea*, Lindl. (*Neottia calcarata*, Hook. Bot. Mag. t. 3403), but with adnate spur, and shorter blunter sepals galea and lip.

Scutellaria distans. Stems slender, flexuous, 3 to 4 dm. long, somewhat recurved-pilose on the angles; internodes rather long (3 to 5 cm.): leaves firm, sparingly appressed-pubescent or glabrate, fan-shaped, broader than long, upper from deltoid-ovate to rhombic-ovate,

short-acuminate, coarsely crenate above the rounded or truncate base, 2 to 5 cm. long, 2 to 3.5 cm. wide: flowers solitary in the axils, on slightly pilose pedicels 0.5 cm. long: calyx pilose in lines, in anthesis 4 to 5 mm. long: corolla dark blue, arcuate, 2 to 2.5 cm. long, puberulent without; the lower lip slightly longer than the upper, with a white spot in the middle. — JALISCO, in the Sierra Madre, west of Bolaños, Sept. 15–17, 1897 (*J. N. Rose*, no. 2951). Related to the northern *S. galericulata*, L.

S. Rosei. Apparently tall (upper portions of plants at hand 6 to 7 dm. high): stem short cinereous-pubescent: lower leaves suborbicular, rounded at tip, upper ovate, acuminate, coarsely crenate-dentate, rounded or subcordate at base, minutely soft-pubescent on both sides, 4 to 6 cm. long, 3 to 4 cm. wide, on very short pubescent petioles 1 to 3 mm. long: raceme elongated, 2 to 2.5 dm. or more in length: the flowers irregularly scattered, alternate, opposite or fascicled: bracts lanceolate, about equalling the glandular-hirsute pedicels: calyx somewhat glandular-hirsute, in anthesis 3 to 4 mm. long: corolla 2 to 2.5 cm. long, rose-purple above; the pubescent tube pale; the lower lip somewhat exceeding the upper. — SINALOA, foothills of the Sierra Madre, near Colomas, July 20, 1897 (*J. N. Rose*, no. 1784). *Ghiesbreght's* nos. 88 and 803 from CHIAPAS are probably forms of the species, though with smaller corollas.

S. Pedicularis. Stems slender, minutely cinereous-puberulent: leaves oblong or ovate-oblong, coarsely crenate-dentate, short-acuminate and blunt at tip, rounded or subtruncate at base, sparsely pubescent above with short appressed hairs, glabrous beneath, 2 to 3.5 cm. long, 1 to 2 cm. wide, on slender finely-puberulent petioles 1.5 to 2 cm. long: raceme 15–25-flowered, at first dense, resembling *Pedicularis canadensis*: bracts linear or lanceolate, equalling the pedicels (3 to 5 mm. long): calyx puberulous, in anthesis 3 to 3.5 mm. long, in fruit becoming 8 to 9 mm. long: corolla yellowish, 2.5 cm. long, the tube barely 2 mm. in diameter nearly to the slightly broader throat; lower lip a little longer than the upper: seeds roughish, not margined. — CHIAPAS, near Tumbala, alt. 1,230 to 1,700 m., Oct. 20, 1895 (*E. W. Nelson*, no. 3342). The specimens are rather fragmentary, so that the base of the plant cannot now be described. Nearly related to the showy *S. Mociniana*, Benth., which has much longer scarlet corollas.

Stachys (Stachyotypus) flaccida. Ascending or spreading, freely branched, 4 dm. high or more (?): stems minutely pilose or glabrate; internodes 1 dm. long: leaves thin and flaccid, glabrous or minutely appressed-pubescent beneath, the lower on slender petioles, the upper

becoming sessile, deltoid-ovate to oblong, cordate at base, coarsely crenate, 3 to 7 cm. long: verticels 3–6-flowered, remote, only the lower conspicuously leafy-bracteate: pedicels very short: calyx minutely puberulent, in anthesis 6 mm. long, cleft half way to the base into lance-subulate teeth: corolla apparently pale, 1.1 to 1.3 cm. long; the tube once and a half as long as the calyx; the 3-lobed lower lip twice as long as the entire short pubescent galea. — OAXACA, Hacienda de Caciques, District of Cuicatlan, Aug. 4, 1895, alt. 2,150 m. (*L. C. Smith*, no. 612). Apparently related to *S. Drummondii*, Benth.

S. (Calostachys) oaxacana. Stems slender, 2.5 to 6 dm. high, densely retrorse-hispid below, sparingly so or only glandular-puberulent above: leaves deltoid-ovate to deltoid-lanceolate, coarsely crenate, cordate or truncate at base, 1.5 to 3.5 cm. long, above somewhat strigose-pubescent, beneath more or less pubescent, often white with appressed longitudinally spreading stiffish hairs; petioles slender, the lower equalling the blades, the upper shorter: verticels 4–6-flowered, rather remote, only the lowest conspicuously bracteate: pedicels about equalling the calyx: calyx green, glandular-puberulent, in anthesis 5 mm. long, in fruit becoming as broad as long, with 5 deltoid-subulate teeth: corolla scarlet, 2 to 2.5 cm. long, minutely puberulent or glabrate without; the 3-lobed lower lip slightly exceeding the entire or emarginate galea. — OAXACA, near Reyes, alt. 2,060 to 3,080 m., Oct. 20, 1894 (*E. W. Nelson*, no. 1795); Sierra de San Felipe, alt. 2,150 m., Sept. 23, 1895 (*C. Conzatti*, in exsicc. L. C. Smith, no. 709); mountains of San Juan del Estado, alt. 2,300 m., Oct. 21, 1895 (*L. C. Smith*, no. 924); Cuicatlan, alt. 1,675 m., Dec. 9, 1895 (*V. González*, no. 47). Closely related to *S. coccinea*, Jacq., with which it has formerly been confused, but from which it is distinguished by its very slender habit, smaller calyx and different pubescence.

Calamintha oaxacana. Shrub with smooth brown bark, and very slender minutely puberulent or glabrate branchlets: leaves thin, elliptic-ovate, 1 to 1.5 cm. long, finely and sharply serrate, acute at tip, narrowed or rounded at base; petioles filiform, about equalling the leaf-blades: flowers solitary, axillary, on slender 2-bracteate pedicels 5 to 8 mm. long: calyx tubular, 13-costate, in anthesis 6 to 7 mm. long; the tube twice exceeding the lance-subulate lobes; the upper lip with 3 upturned lobes, the two lobes of the lower straighter: corolla red, 3 to 3.25 cm. long, short-pubescent without. — OAXACA, El Parián-Etla, alt. 1,200 m., Nov. 1898 (*V. González & C. Conzatti*, no. 901). Nearest related to *C. coccinea* of the southern United States. Habit-

ally somewhat resembling *Gardoquia mexicana*, but with the definitely bilabiate lip of *Calamintha*.

Cunila tomentosa. Stem tall (probably 8 dm. high), sharply quadrangular, freely paniculate-branched, densely tomentose above and on the younger parts: leaves lanceolate to ovate-lanceolate, acuminate, sessile or short-petioled, entire or sparingly appressed-serrate, above puberulent, beneath densely white-tomentose, 2 to 5 cm. long, 1 to 1.5 cm. wide: racemes dense, spiciform, 1 to 4 cm. long, solitary or in 3's, terminating the short branches: pedicels slender, about equalling the calyx: calyx 2 to 3 mm. long; the tube twice or thrice as long as the lance-subulate teeth, densely villous especially within the throat: corolla villous, slightly exceeding the calyx: stamens mostly included. — OAXACA, between Pluma and San Miguel Suchistepec, alt. 1,850 m., March 21, 1895 (*E. W. Nelson*, no. 2495).

Hyptis (Cephalohyptis) madrensis. Stems procumbent, puberulent (densely short-pilose-hirsute on the younger parts), freely branching; internodes 0.5 to 1 dm. long: leaves thickish, oblanceolate to elliptic-obovate, coarsely crenate-dentate above, the subcuneate entire base narrowed gradually to a short petiole, appressed-pilose on both faces, dark green above, pale beneath, 2.5 to 5 cm. long, 1 to 2 cm. broad: peduncles axillary, 3 to 5 cm. long: fruiting head 2 cm. in diameter: bracts foliaceous, lanceolate to oblong, entire or coarsely dentate, 1 cm. or less long: calyx villous, the long subulate teeth setulose. — TEPIC, foothills of the Sierra Madre, near Pedro Paulo, Aug. 3, 1897 (*J. N. Rose*, no. 1958). Resembling, apparently, *H. Parkeri*, Benth., of South America but differing from that in its pubescent leaves and calyx.

H. (Minthidium) Pringlei. Stem 1 m. (?) high, freely branching, more or less pubescent with pilose or somewhat strigose hairs: leaves lanceolate, acute, subsessile or short-petioled, entire, essentially glabrous, 2 cm. or less long: flowers axillary, 2 to 6 in a fascicle: pedicels slender, glabrous, becoming 2 mm. long in fruit: calyx glabrous, campanulate, in anthesis 1.5 mm., in fruit 3 to 4 mm. long, cleft one-third to the base into narrowly deltoid subacuminate lobes: corolla slightly exceeding the calyx. — SAN LUIS POTOSI, Tamasopo Cañon, Aug. 5, 1890 (*C. G. Pringle*, no. 3223). Related to *H. verticillaris*, with which it has been confused, but with axillary flowers.

H. (Minthidium) axillaris. Similar to the preceding: leaves lanceolate or rhombic-lanceolate, 7 cm. or less in length, acuminate, coarsely and irregularly serrate above the middle, entire below and cuneate to petioles 1 cm. or less long, puberulent above, pilose beneath on the

nerves: calyx sparingly pubescent or glabrate, salverform, with shorter broader lobes. — PUEBLA, near Metlaltoyuca, alt. 250 m., Jan. 31, 1898 (*E. A. Goldman*, no. 48).

H. (Hypenia § Laxiflorae) Nelsonii. Tall, stem smooth and glossy below, minutely puberulent above: leaves thick, glabrous, rather glaucous, lance-acuminate, slightly auriculate-clasping at base, those of the stem 1.5 to 2 dm. long, with fine short teeth along the margin, the upper much shorter and entire: panicle 4 to 5 dm. long, dichotomous; the lower ascending branches 3 dm. long: bracts ovate-lanceolate, acuminate, puberulent, 1 cm. or less long: ultimate pedicels 0.5 to 1 cm. long: calyx puberulent, campanulate, in anthesis 5 to 6 mm., in fruit 1 cm. long, strongly 13–nerved, slightly bilabiate; the deltoid acuminate lobes one-half as long as the tube: corolla 2 to 2.25 cm. long; the tube constricted below, tubular and slightly enlarged upward; the blunt lobes only 3 or 4 mm. long: styles and anthers exserted, glabrous: nutlets oblong-obovate. — JALISCO, between San Sebastian and the summit of Mt. Bufa de Mascota, alt. 1,850 m., March 20, 1897 (*E. W. Nelson*, no. 4108). A unique plant among the Mexican species, belonging to a section hitherto known only from Brazil and adjacent South America.

Lycium geniculatum. Branches slender, geniculate, covered with pale gray bark; spines slender, on the flowering branches about 8 mm. long, barely 1 cm. apart: leaves very glaucous, glabrous, oblong to obovate, blunt or acute, 2.5 cm. long or less, on slender petioles 1 cm. or less in length: flowers abundant in small cymes, terminating the rather crowded short ultimate branchlets: pedicels 7 to 9 mm. long: calyx glabrous, short campanulate, 2 mm. high, slightly broader, with 5 spreading lance-subulate teeth 1 to 1.5 mm. long: corolla 1.2 cm. long, funnelform, with broad-cordate lobes 4 to 5 mm. long, pubescent within the tube: stamens slightly unequal, a little exserted; filaments pubescent below: fruit 5 to 8 mm. in diameter, red with a bloom. — PUEBLA, near Tehuacan, Nov. 27, 1895 (*C. G. Pringle*, no. 7000). Nearest related, apparently, to *L. cestroides*, Schl., of Brazil.

Margaranthus sulphureus. Annual, glabrous; stem stout and rather fleshy, 4 dm. high, branching above: lower leaves alternate, the upper and those of the branches geminate and unequal, from ovate to broadly rhombic-obovate, subentire or shallowly and bluntly sinuate, the larger 3 to 6 cm. long, 3 or 4 cm. wide, narrowed below to winged petioles varying from 1 to 4 cm. long; upper leaves smaller, sometimes subsessile: flowers generally single from each of the upper axils; pe-

duncle slender, somewhat arcuate, in fruit becoming 0.5 to 1.5 cm. long: calyx in anthesis 3 or 4 mm. long, sparingly pilose, with 5 short deltoid ciliate lobes: corolla campanulate-urceolate, 7 to 10 cm. long, nearly as broad, sulphur-yellow, with purple patches at base: fruiting calyx glabrate, globose, 1 to 1.5 cm. in diameter, the short calyx-tips closely connivent. — MEXICO, borders of ditches, Valley of Mexico, July 10, 1865 or 1866 (*Bourgeau*, no. 111), Valley of Mexico, alt. 2,250 m., Oct. 4, 1899 (*C. G. Pringle*, no. 8215). A much coarser plant than the similar *M. solanaceus*, with larger yellower corolla.

Athenaea Nelsonii. Stems petioles and pedicels glandular-villous, fuscous: leaves solitary or geminate and very unequal, on petioles 8 cm. or less in length, broadly ovate, acuminate, equally or unequally cordate at base, entire, undulate or slightly sinuate-toothed, the larger 2 dm. long, thin, dark green and minutely pubescent above, pale and appressed-pilose beneath, especially on the nerves: flowers in fascicles of 5 to 15: pedicels at first rather short, in fruit becoming 2 to 3 cm. long: calyx thin, glandular-pilose, short-campanulate, in anthesis 5 to 6 mm. high and broad, rounded or subtruncate at base, the tube hardly equalling the 5 deltoid lobes: corolla yellowish, 1.5 to 2 cm. long, deeply cut into oblong ciliate lobes 1 cm. long: filaments broad at base, inserted midway up the throat of the corolla, rather shorter than the oblong anthers (3.5 to 4 mm. long): fruiting calyx becoming 1 cm. in diameter, inclosing the scarlet berry. — CHIAPAS, between Tumbala and El Salto, alt. 460 to 1,385 m., Oct. 29, 1895 (*E. W. Nelson*, no. 3395). A large-leaved species habitally resembling *A. viscosa*, Benth. & Hook. (*Saracha viscosa*, Schrad., Sweet, Brit. Fl. Gard. ser. 2, t. 323), but with smaller more regular calyx, more deeply lobed corolla and much shorter filaments.

Physalis subintegra. Perennial from a very slender root-stock 3 or 4 dm. long, ascending, slightly branching from near the base: stems tough, dark green, sparingly appressed-pubescent with simple hairs or glabrate, about 3 dm. high: leaves from ovate-lanceolate to broadly ovate, 3 to 6 cm. long, 1.5 to 3 cm. broad, entire or slightly repand-dentate, somewhat appressed-pubescent on both surfaces, tapering above to a blunt tip and slightly rounded below to a petiole 0.5 to 2 cm. long: peduncle short, 0.5 to 1 cm. long: calyx in anthesis 7 to 10 mm. long, pubescent, with triangular-lanceolate or ovate acute lobes: corollas pubescent without, the earlier 2.5 cm. broad, the later smaller, sulphur yellow with large dull brown markings at base: one filament slightly exceeding the others, 5 mm. long; anthers oblong, purplish, 2 or 3 mm. long: fruiting calyx globose-ovoid, a little sunken at base, slightly 5-angled, firm and

strongly veiny, 3 to 3.5 cm. long. — MEXICO, Sierra de las Cruces, alt. 3,080 m., Sept. 19, 1899 (*C. G. Pringle*, no. 8225); VERA CRUZ, Orizaba (*Botteri*, no. 207): OAXACA, slopes of Mt. Zempoaltepec, alt. 2,400 to 3,080 m., July 5–10, 1894 (*E. W. Nelson*, nos. 587, 681): JALISCO, between Huejuilla and Monte Escobedo, Aug. 25, 26, 1897 (*J. N. Rose*, nos. 2577, 2606). Nearly related to *P. arenicola*, Kearney, of the southeastern United States.

P. philippensis. Freely branching from a stout woody caudex; the slender branches somewhat ligneous at base, about 2 dm. in length, long-pilose with crisp white jointed hairs: leaves appressed-pubescent above, pilose beneath on the veins and ciliate on the margins, broadly rhombic-obovate, coarsely and bluntly angulate-sinuate, 1 to 3 cm. long, 1 to 2.5 cm. wide, broadly subcuneate below to a broad long-pilose petiole 1 to 1.5 cm. long: peduncles 1 cm. long, pilose: calyx during anthesis about 8 mm. long, white-pilose, cleft into narrowly ovate acutish or blunt lobes: corolla short-campanulate, 1.5 cm. long, 2 to 2.5 cm. broad, whitish or pale yellow, with very broad purplish markings: 2 filaments longer than the others, 7 mm. long; anthers short-oblong, purple and yellow, 3 or 4 mm. long: fruit not seen. — OAXACA, Sierra de San Felipe, alt. 2,617 m., June 1, 1894 (*C. G. Pringle*, no. 5621).

P. sordida. Perennial, densely pubescent all over with short sordid glandular-pilose hairs: the stems depressed, 4 or 5 dm. long, freely branching: leaves from suborbicular to ovate, coarsely but bluntly sinuate-dentate, subcordate or truncate below, pubescent on both faces, 1 to 5 cm. long, 1 to 3 cm. broad, on slender glandular-pilose petioles 1 to 3 cm. long: peduncles short, barely 1 cm. long in fruit: calyx in anthesis 6 or 7 mm. long, sordid-pubescent, with triangular-lanceolate acute lobes: earlier corollas 1.5 cm. broad, sulphur-yellow, with small drab or brownish patches at base: filaments somewhat unequal; anthers yellow and green, narrowly oblong, 3 or 4 mm. long: fruiting calyx broadly short-ovate, glandular-pilose, not conspicuously angled, 1.5 to 2 cm. long. — Apparently in sand (the entire plant coated with fine sand), OAXACA, Boca de Leon, Telixtlahuaca, alt. 2,310 m., Aug. 8, 1895 (*Albert L. Smith*, no. 637). Nearest related, apparently, to *P. rotundata*, Rydberg, of the southwestern United States.

P. saltillensis. Puberulent throughout with fine white stellate hairs: branches slender, terete below, sub-angulate above: leaves elliptic-ovate, coarsely and bluntly sinuate-dentate, the upper unequal and geminate, 3 to 6 cm. long, 2 to 4 cm. wide, unequally subcuneate or rounded at base

to a slender petiole 1.5 to 3.5 cm. long: peduncle filiform, usually curved at tip, in fruit 2 to 3.5 cm. long: calyx in anthesis 6 mm. long, with short narrowly triangular acutish or blunt lobes: corolla 1 to 1.5 cm. broad, sulphur-yellow, with purple patches at base: fruiting calyx ovate, 1.5 to 2 cm. long, obscurely 5-angled, the tips connivent: mature berry orange, edible. — COAHUILA, in shade, Saltillo, Sept. 1898 (*Edw. Palmer*, no. 332).

P. Rydbergii. Perennial (?): stem slender, tough, much branched, finely glandular-puberulent: leaves lanceolate to ovate-lanceolate, subentire or shallowly sinuate-dentate, finely glandular-pubescent on both faces, 0.5 to 1.5 cm. long, 3 to 5 mm. broad, acute at tip, tapering unequally at base to slender petioles about half as long: peduncle filiform, in fruit becoming 1 to 1.5 cm. long: calyx open-campanulate, the lobes not connivent at tip, in anthesis 0.5 cm. long, with ovate-lanceolate blunt lobes: corolla barely 1 cm. in diameter, yellow, with 5 acute lobes: fruiting calyx broadly open-campanulate, 1 cm. long, 5–10-angled, strongly reticulate. — MEXICO, Ymala, Sept. 25–Oct. 8, 1891 (*Edw. Palmer*, no. 1713). Dedicated to Per Axel Rydberg, whose critical studies of this genus have greatly cleared the confusion which prevailed in the American species, and to whose unique section *Crassifoliae* the present species is an addition.

Solanum (Anthoresis) plumense. Shrub with cinereous smoothish bark: young branches finely pulverulent: leaves ovate-lanceolate, long-acuminate, acutish or rounded at the base, 1 to 1.8 dm. long, 4 to 6 cm. wide, entire or slightly undulate, minutely cinereous-stellate on both faces; petioles slender, 2 to 5 cm. long: corymb on a long cinereous-pulverulent peduncle, in fruit 1 to 1.5 dm. broad, many-flowered: calyx 2 mm. high, cinereous-stellate, with 5 ovate-deltoid bluntish lobes: corolla white, stellate-pulverulent without, 0.5 cm. high, 1.5 cm. broad, with ovate-lanceolate lobes: stamens subequal, oblong, truncate, 2 to 2.5 mm. long: fruit subglobose, sparingly pulverulent, 1 cm. in diameter. — OAXACA, about Pluma, alt. 925 to 1,480 m., March 17, 1895 (*E. W. Nelson*, no. 2493).

S. (Polymeris) dejectum. Branching a little above the stout woody root: stems slender, herbaceous, ascending, decumbent at base, branching, cinereous-pilose above with fine stellate hairs: upper leaves geminate, unequal, from subreniform to broadly ovate, rounded or tapering to a bluntish tip, subtruncate or gradually tapering below to a petiole 1 to 3.5 cm. long, finely and closely cinereous-stellate on both faces, more strongly so beneath, entire or slightly undulate, 2 to 5 cm. long:

peduncles slender, in anthesis erect, 0.5 to 1 dm. long, soon strongly dejected: calyx white-stellate, with 10 long linear-subulate divisions: corolla 3 to 4 cm. broad, plicate, 5-angled, violet or violet and white: filaments short, one of them twice or thrice exceeding the others, 5 mm. long; anthers broad-lanceolate, blunt, 5 mm. long: style 10 to 12 mm. long, glabrous: fruit said to be yellow. — DURANGO, rare in crevices of rocks, Iron Mt., &c., near Durango, July, 1896 (*Edw. Palmer*, no. 347): MEXICO, Mount Zacoalco, July 10, 1865 or 1866 (*Hahn*, no. 543); San Juan del Rio, July 14, 1896 (*C. G. Pringle*, no. 7202): GUANAJUATO, in fields, 1895 (*A. Dugès*). Related, apparently, to *S. somniculentum*, Kunze, but differing in its closer whitish pubescence, longer petioles, longer more slender peduncles, and generally blunter leaves.

S. (Polymeris) nocturnum. A woody climber with the habit of *S. lentum*, Cav.: branches glabrous, or minutely stellate-puberulent at tips: leaves solitary or geminate, ovate, 2.5 to 5 cm. long, 2 to 3 cm. wide, with acute or obtuse tips, rounded or acutish below to slender petioles 1 cm. or less in length, subentire, glabrous on both faces, or sparingly puberulent when young: peduncles solitary or in 2's, 1 to 2 cm. long, bearing solitary nocturnal blue flowers: calyx, in anthesis sparingly puberulent, later quite glabrate, a shallow cup with 10 lance-subulate teeth; corolla minutely and sparingly puberulent without, 12 mm. high: berry apparently red, glabrous, 1 cm. in diameter. — GUERRERO, low sandy soil, Acapulco, Jan., 1895 (*Edw. Palmer*, no. 533): OAXACA, river-bed above Tehuantepec, Jan. 10, 1896 (*Ed. Seler*, no. 1625).

S. (Cryptocarpum) macroscolum. Plant with the habit of *S. rostratum*, Dunal: stem puberulent, slightly glandular above, armed with rather scattered yellowish straight stout spines 1 to 1.75 cm. long: leaves very deeply pinnatifid, the segments again cut into rounded lobes, sparingly pilose above or glabrate, armed with long stout spines: calyx hirsute, becoming glabrate, armed with several long (1.5 cm.) slender spines and many shorter finer ones, deeply cut into lanceolate lobes: corolla as in *S. rostratum*: 4 stamens subequal, 8 or 10 mm. long, the other larger, arcuate, 18 mm. long: fruiting calyx, including the persistent lobes, 15 to 18 mm. long. — OAXACA, near the town of Oaxaca, Sept. 19, 1895 (*L. C. Smith*, no. 814), Nov. 18, 1895 (*Ed. Seler*, no. 1394): originally collected by Haenke, presumably between Acapulco and the City of Mexico.

S. (Nycterium) azureum. Stem fruticose, the young branches, with peduncles pedicels and calyx, cinereous with dense but fine stellate pubescence; the branches sparingly beset with remote straight slender

brown spines 7 mm. or less in length: leaves solitary or the upper geminate, thin, elliptic-ovate, 4 to 9 cm. long, 2 to 3.5 cm. broad, deeply sinuate-pinnatifid into 5 or 7 unequal oblong or obovate entire or undulate obtuse lobes; above green and thinly pubescent with appressed-stellate hairs, beneath slightly more pubescent, especially on the prominent sometimes sparingly short-setulose nerves; petioles slender, 1 to 3.5 cm. long, often sparingly setulose: peduncles lateral, 5–10-flowered, becoming 6 or 7 cm. long: calyx campanulate, in the staminate flower unarmed, in the pistillate with slender spines 5 mm. or less in length, the 5 lance-subulate teeth 8 or 9 mm. long: corolla 4 or 5 cm. broad, plicate, stellate-tomentose without, apparently sky-blue, slightly irregular, deeply cut into 5 ovate-lanceolate curved segments: anthers yellow, subsessile, in the staminate flower the two shorter ones 1 to 1.5 cm. long, the three longer 3 to 3.5 cm. long, strongly curved above; in the hermaphrodite flower the two short anthers scarcely 1 cm. long, the three long ones straight, 1.5 cm. long: style 2.5 cm. long, strongly curved above: fruit globose, 1.25 cm. in diameter, in herbarium specimens olive-brown; the fruiting-calyx deeply cleft, excluding the fragile elongated lance-subulate tips, about half the height of the fruit. — SINALOA, Topalobampo, Sept. 15–25, 1897 (*Edw. Palmer*, no. 178). Related to the common *Solanum amazonium*, Ker, and to *S. obtusifolium*, Mart. & Gal. From *S. amazonium* it differs principally in its thin deeper-lobed and greener leaves, its longer stamens and shorter fruiting-calyx. From of *S. obtusifolium* as described it is separated by its larger leaves which are not "cordate-ovate," and its much larger flowers.

Datura villosa. Annual, 1.5 to 3 dm. high: young branches and petioles villous with long white hairs: leaves 0.5 to 1 dm. long, petiolate, ovate, sinuate-angulate or deeply cut, villous above and especially beneath on the veins, becoming glabrate: calyx cylindric, 2.5 to 3.5 cm. long, somewhat villous, with 5 short teeth: corolla narrow, twice exceeding the calyx, pale below, purplish at edge, with 5 short lance-subulate teeth: capsule puberulent, about 5 cm. across, armed with comparatively few coarse and unequal flat prickles. — JALISCO, Bolaños, Sept. 10–19, 1897 (*J. N. Rose*, no. 3680): SAN LUIS POTOSI, in sand near the city of San Luis Potosi, 1876 (*J. G. Schaffner*, no. 706); in the mountains at 1,850 to 2,450 m., 1878 (*Parry & Palmer*, no. 658, in part). — Related to *D. quercifolia*, HBK., with which it has been confused.

CESTRUM ELEGANS, Schlecht., var. **truncata.** Like the species as

represented in Bot. Reg. xxx. t. 43, but with the corolla limb merely short-toothed or subentire, not definitely lobed. — VERA CRUZ, San Miguel del Soldado, alt. 1,850 m., April 20, 1899 (*C. G. Pringle*, no. 7800).

C. fulvescens. Branches stout; cortex yellowish brown, pruinose or glabrate: leaves lanceolate or ovate-lanceolate, short-acuminate, 4 to 7 cm. long, 1 to 2 cm. wide, on slender petioles 1 to 2 cm. long, dark green and minutely puberulent above, yellow-green and puberulent beneath: inflorescences on short (1 dm. or less) leafy fulvous-pubescent branches; the flowers in small axillary clusters or more abundant at the naked tip; pedicels 3 to 7 mm. long, jointed below the very slender neck (3 mm. long) of the calyx: tubular-campanulate calyx broadened above, 1.5 to 2 cm. long, glabrous, conspicuously nerved, with 5 (or 6) unequal deltoid acute ciliate lobes 4 mm. or less in length: corolla 2.5 to 3 cm. long, the yellow tube slender, slightly exceeding the calyx, clavate above and enlarged at the throat; limb of 5 (or 6) elongate-lanceolate strongly involute ascending yellow-brown lobes, short-pubescent especially within. — OAXACA, mountains of Telixtlahuaca, alt. 2,000 m., Apr. 5, 1895 (*L. C. Smith*, no. 343). Apparently a member of the section *Habrothamnus*, but with paler flowers than in any described species of that section.

C. Bourgeauianum. Branches slender, glabrous, covered with a grayish brown cortex: leaves glabrous, entire, oblong-lanceolate to oblong-elliptic, acutish, including the short petiole 4 to 6 cm. long, 1 to 2.5 cm. wide: inflorescence leafy-paniculate, of mostly compound sparingly bracteate flexuous or drooping long-peduncled racemes 4 to 9 cm. long: pedicels slender, 3 to 9 mm. long, gradually thickened to the glabrous campanulate shallowly 5-cleft calyx (in anthesis 4 to 5 mm. long, 2 to 3 mm. broad): corolla yellow, glabrous throughout, 1.7 to 2 cm. long, narrowly funnelform below, gradually broadened at the throat; limb with 5 generally broad-flaring somewhat rounded lobes nearly 0.5 cm. long: mature fruit nearly 1 cm. in diameter; calyx becoming as broad as long. — MEXICO, Valley of Mexico, June 12, 1865 or 1866 (*Bourgeau*, no. 57): OAXACA, Mts. southeast of Miahuatlan, alt. 2,950 to 3,235 m., 1895 (*E. W. Nelson*, no. 2525). This is perhaps *C. pedunculare*, Pavon, but that species is described as having glandular reddish branches, purplish-veined leaves, and acuminate corolla-lobes.

Aster jalapensis. Perennial from slender elongated rootstocks: stems decumbent at base, 1 to 2.5 dm. high, slender, very leafy, pilose in lines: leaves oblanceolate, bluntly and shortly acuminate, glabrous or

minutely puberulent, the upper half coarsely appressed-serrate, the lower half entire and cuneate to a narrow-winged subpetiolar strongly ciliate base, including the subpetiolar portion 3 to 5 cm. long, 0.5 to 1 cm. wide; the upper smaller: peduncles slender, bracteate, elongate, 2 to 6 cm. long, bearing 1 or 2 heads about 1 cm. broad: bracts of involucre 3-seriate, linear-oblong, the inner 6 mm. long, the outer much shorter, slightly ciliate on the margins, with short bluntish herbaceous appressed tips: rays white: achene pubescent. — VERA CRUZ, wet ledges, Barranca de Chavarrillo, alt. 920 m., Apr. 24, 1899 (*C. G. Pringle*, no. 8118). Somewhat resembling *A. bullatus*, Klatt, but a lower more slender plant with shorter broader leaves, broader involucral bracts, and more slender peduncles.

Encelia Pringlei. Stem subterete, scabrous-puberulent: leaves oblong or ovate-lanceolate, acuminate, the lower rather abruptly narrowed below the middle into an oblong portion which is somewhat auriculate at base; the larger 1.2 to 1.4 dm. long, 4 to 6 cm. wide, above tuberculate-scabrous; beneath scabrous, glandular-dotted, and somewhat villous on the nerves; petioles very short: inflorescence terminal, corymbose, 1 to 1.5 dm. across: heads 1 to 1.5 cm. broad, excluding the rays 1.5 cm. long: bracts of involucre 2–3-seriate, the outer successively shorter, linear-oblong, bluntish, appressed-pubescent and somewhat glutinous: rays 8 or 9, ovate-oblong, 1 cm. long, orange-yellow: achene 6 mm. long, silvery-silky; the pappus of two lanceolate awn-tipped pales 4 or 5 mm. long, and two shorter broader somewhat lacerate ones. — HIDALGO, hillsides above Pachuca, alt. 2,770 m., Sept. 14, 1899 (*C. G. Pringle*, no. 8248). With remarkably paleaceous pappus for an *Encelia*, but apparently very closely related to *E. glutinosa*, Rob. & Greenman.

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Vol. XXXVI. No. 26. — April, 1901.

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By B. L. Robinson.

Presented March 13, 1901. Received March 16, 1901.

I. — SYNOPSIS OF THE GENUS MELAMPODIUM.

In the following key to *Melampodium* the genus is limited as by Bentham and Hooker in their Genera Plantarum and by Hoffmann in Engler & Prantl's Natürlichen Pflanzenfamilien. It will, therefore, be unnecessary here to reproduce the generic description or give generic synonymy. The key is based chiefly upon the material which has accumulated in the Gray Herbarium, including the recently acquired Klatt collection and some borrowed material from the U. S. National Museum. The writer has also in connection with this work been kindly permitted by Mr. Casimir de Candolle to examine and trace the types in the Prodromus Herbarium. Much difficulty has been experienced in giving the species a natural sequence, and after many efforts the hope of securing such an arrangement has been abandoned. The employment of pubescence in grouping the species of this genus is new and appears to yield more satisfactory results than an implicit reliance upon the fructiferous bracts. The latter, as is well known, often surpass the achenes, forming above them a cup or hood. This hood is often pointed dorsally at the summit and the point may be recurved or spirally coiled. Unfortunately, however, these features, the hood and its appendage, show too great variability in certain nearly related forms, such as *M. sericeum* and its varieties, to yield diagnostic characters of the first rank. However, the presence or absence of a hood can usually be determined readily, and the two sections *Eumelampodium* and *Zarabellia* may conveniently be retained.

Bentham and Hooker, l. c., estimated the species at eighteen, and Hoffmann, l. c., accords twenty-five species to the genus. It will be seen, however, that this number can, with our present knowledge, be somewhat increased. The genus reaches its greatest development in Mexico, where, if we include Lower California and Central America, no less than thirty-one species occur. Of these species three reach the southern United States (one merely as an introduction), two are found

in the West Indies, and two or three extend to South America. There are also two species known exclusively from South America. Early in the nineteenth century a species of *Melampodium* (*M. diffusum*) was discovered on the island of Luzon in the Philippines. As the genus is otherwise American, the occurrence of this species in a region so remote has always been problematic, and it has been a matter of no small interest to find the Philippine plant closely matched by specimens recently collected by Dr. Edward Palmer, about Acapulco, Mexico. There can therefore be scarcely a doubt that the genus is in reality of New World origin, and that a single Mexican species was accidentally introduced into the Philippines, where it attracted scientific attention before it was recognized in America. This seems the more likely from the circumstance that Mexico and the Philippines were under the same national control, and early connected by a certain amount of oceanic traffic. This being the case, the transference of seed from Acapulco, the most important Pacific port of Mexico, to the neighborhood of Manila, presents no inherent improbability. The writer is under obligation to M. Robert Buser of the De Candollean Herbarium for critical comparison, notes, and sketches relative to this and related species.

In this paper the term *fruit* is applied to the ray-achene and the closely enveloping bract.

§ 1. EUMELAMPODIUM, DC. Inner (fructiferous) bracts of the involucre exceeding the inclosed achene and developed at the summit into a cup or hood (this obsolete in some forms of *M. sericeum*). — Prodr. v. 518 (1836).

* Lower surface of the leaves sparingly pubescent to hirsute, villous, or tomentose, but not sericeous.

+ South American species: hoods scarcely or not at all appendaged.

++ Herbaceous annual: rays conspicuous, 6.5 mm. long, unguiculate.

1. M. PALUDICOLA, Taubert in Engl. Jahrb. xxi. 455 (1896). — Swamps on the Paranahyba River, Prov. Goyaz, Brazil, *Ule*, no. 2978. Not seen by the writer.

++ ++ Suffrutescent: rays very small, inconspicuous.

2. M. SUFFRUTICOSUM, Baker in Mart. Fl. Bras. iv. pt. 3, 162 (1884). On the Esmeralda plains of the upper Orinoco in S. Venezuela. A species omitted from the Index Kewensis. The achenes are crowned by a shallow cup, otherwise the plant would be placed next *M. camphoratum*, to which according to the original description it is presumably related.

+ + Species of Mexico and S. United States.

++ Rays short and inconspicuous: appendage of the hood elongated, recurved or coiled: heads usually (but not always) subsessile or short-peduncled.

3. M. LONGICORNU, Gray, Mem. Am. Acad. v. 321 (Pl. Thurb.), 1854, where by misprint *longicorne*. — S. Arizona, near Ft. Huachuca, *Lemmon*, no. 2777; Sonora, Santa Cruz, *Thurber*, no. 937 (type); Chihuahua, near the city, *Pringle*, no. 10; San Luis Potosi, *Parry & Palmer*, no. 443½.

++ ++ Ligules longer, exceeding the involucral bracts, conspicuous: peduncles mostly long.

= Soft-stemmed, strictly herbaceous and annual.

a. Pubescence short, scanty: leaves oblong to linear, entire: appendage of the hood long: involucre gamophyllous about to the middle.

4. **M. appendiculatum.** Slender, erect, sparingly pubescent annual, 3 to 4 or more dm. high, branched almost from the base: leaves thin, oblong to linear, attenuate at the apex, scarcely narrowed to the sessile subauriculate base: obsoletely serrate to quite entire, the larger ones (near the middle of the stem) 5 cm. long, 1 cm. broad: peduncles 2 to 7 cm. long, erect, slender: involucre saucer-shaped or shallowly cup-shaped, gamophyllous, the limb shallowly 5-lobed; the lobes rounded or barely and very obtusely pointed, their margins scarious: pubescence of the peduncles and involucres short and sparing: rays 8 to 10, oblong, yellow, 6 mm. in length, 2–3-toothed at the apex; fruit tuberculate, the conspicuous appendage a linear coiled awn from an ovate-lanceolate somewhat 2-toothed base: pales scarious. — Southwestern Chihuahua, *Dr. Edward Palmer*, no. 245 (collection of 1885). Type in herb. Gray. This species has the outer involucre of *M. cupulatum*, Gray, and the fruit of *M. longicornu*, Gray, yet it is clearly distinct from both, differing from the former not only in its long peduncles and well-developed ligules, but in stature and in the size of the leaves, and from the latter in the presence of a hood and appendage (both totally lacking in *M. cupulatum*) and in the subauriculate base of the leaves.

Var. **leiocarpum.** Similar in all points but the fruit smooth, striate, glandular-punctate, not at all tuberculate. — Collected by Dr. Edward Palmer at Alamos, 16–30 September, 1890, no. 726. Type in herb. Gray.

Var. **sonorense.** Involucre deeper, subcampanulate: fruit slightly roughened: otherwise like the type. — Collected by C. V. Hartman at Cochuto, Sonora, 2 October, 1890, no. 71. Type in herb. Gray.

b. Pubescence short and stiff: leaves lanceolate, undulate: fruit hooded, but the appendage shorter or sometimes obsolete.

5. **M. arenicola.** Decumbent or suberect, branching from near the base; stems dark purple, covered with stiff white somewhat reflexed

hairs: leaves lanceolate from a narrowed auriculate base, undulate to sparingly and irregularly scabrous-pubescent upon both surfaces, 3 to 5 cm. long, 8 to 11 mm. broad: peduncles slender, pubescent, 3 to 7 cm. long; heads often nodding, 1.2 cm. in diameter (including narrow yellow entire or bidentate ligules); involucre shallow, saucer-shaped, the 5 divisions united nearly to the middle, broad, scarious and ciliate at the margin: fruit finely striate, punctate and slightly tuberculate, bearing a well-developed hood surmounted by a slender recurved hispidulous appendage not flanked by lateral teeth at the base. — Collected by F. H. Lamb in sandy soil on Isla Piedra, Mazatlan, Sinaloa, 31 December, 1894, no. 361a. Mr. Lamb's no. 380 also from Mazatlan differs in having no tubercles upon the fruit and in the obsolescent appendage, yet it is probably of the same species. Type in herb. Gray.

c. Pubescence copious, soft, long, villous: leaves ovate-lanceolate to ovate: appendage of the hood short: involucre gamophyllous only near the base.

6. M. LONGIPILUM, Robinson. Involucre externally villous, its divisions acutish. — Proc. Am. Acad. xxvii. 173 (1892). — San Luis Potosi, *Pringle*, nos. 3639, 4537.

= = Stems tending toward lignescence: roots at least in part perennial: species of northern Mexico and southern United States.

a. Heads rather small, (including the rays) about 1 to 1.2 cm. in diameter: leaves conspicuously sinuate or pinnatifid: rays thin, short.

7. M. CINEREUM, DC. l. c. (1836). Hood muticous. — Laredo, Texas, *Berlandier*, who appears to have confused this with the variety *ramosissimum*, so that his numbers cannot be depended upon.

Var. RAMOSISSIMUM, Gray. Hood mucronate. — Syn. Fl. i. pt. 2, 239 (1884), in part. *M. ramosissimum*, DC. Prodr. v. 518 (1836). — Near Laredo, *Berlandier*, S. W. Texas and adjacent Coahuila, *Palmer*, nos. 556, 557, 558 (coll. of 1880).

Var. ARGOPHYLLUM, Gray. Hood muticous: leaves small, tomentose upon both surfaces, canescent above, snowy white beneath. — Gray in Wats. Proc. Am. Acad. xviii. 104 (1883 without description). — Coahuila and Nuevo Leon, *Palmer*, no. 2068 (coll. of 1880).

8. M. LEUCANTHUM, Torr. & Gray, Fl. ii. 271 (1842). — The commonest form of our southwestern States. Kansas, Hamilton County, *Hitchcock*, no. 250; W. Texas, *Lindheimer*, no. 636, *Reverchon*, no. 1380*, *Thurber*, no. 128, *Heller*, no. 1632, *Pope*, *Bigelow*, *Wislizenus*; New Mexico, *Thurber*, no. 1105, *Wooton*, no. 117; Arizona, *Rothrock*, no. 327, *Palmer*, no. 608, *Pringle*, coll. of 1884; Chihuahua, *Pringle*. This plant has of late been generally regarded as a mere form of

M. cinereum, DC. However, it differs conspicuously in its more entire erect or ascending thickish leaves, its much larger heads (nearly or quite twice as broad) and its long thickish, firm, persistent, and veiny rays. It is a much commoner and more widely distributed plant than *M. cinereum*, and may be conveniently regarded as a specific type.

* * Lower surface of the leaves silky-villous, the pubescence more or less floccu-lent and tending to be deciduous.

\+ Ligules shorter than or about equalling the fructiferous bracts: heads sessile or short-peduncled.

9. M. SERICEUM, Lag. Hoods tipped by a slender recurved append-age. — "Elench. Hort. Madr. 1805," Gen. et Spec. Nov. 32 (1816); DC. Prodr. v. 518; not HBK. — Mexico, *Mendez;* Oaxaca, *Pringle*, no. 6728; Durango, *Rose*, no. 3476; Jalisco, *Rose*, nos. 2819, 3561; Espe-ranza, *Dugès*.

Var. **exappendiculatum.** Hood destitute of a mucro or appendage, sometimes itself obsolete. — In mountains near Morales, San Luis Potosi, *Schaffner*, no. 271 in part; base of Iron Mountain, Durango, *Dr. E. Palmer*, no. 926 (coll. of 1896); Guanajuato, *Prof. A. Dugès, Pringle*, no. 5309; Federal District, *Pringle*, no. 7978 (form approaching *M. hispidum*, HBK).

\+ \+ Ligules conspicuous, usually much exceeding the fructiferous bracts: pedun-cles long and slender.

\+ \+ Leaves (at least in part) pinnatifid; segments rather broad.

10. M. AMERICANUM, L. Spec. ii. 921 (1753); Rel. Houst. 9, t. 21; DC. Prodr. v. 518. — Vera Cruz, Mexico, *Houston*. With this clearly figured plant from Vera Cruz I have been unable to match any speci-mens from Southeastern Mexico. However, the following specimens from the western coast probably belong here: Manzanillo, *Xantus*, and Colima, *Palmer*, no. 136 (coll. of 1897), and no. 1172 (coll. of 1891).

\+ \+ Leaves, at least in part, deeply cleft, segments narrow, linear.

= Outer bracts of the involucre pointless, surrounded by a thin yellow somewhat hyaline border.

11. M. LINEARILOBUM, DC. Prodr. v. 518 (1836). *M. sericeum*, Benth. in Oerst. Vidensk. Meddel. 1852, p. 86, not Lag. — A well-marked species represented by the following specimens: Oaxaca, *Nelson*, nos. 2809, 2339 (pathological); Chiapas, *Nelson*, no. 2949; Guerrero, hills near Iguala, *Pringle*, no. 9162; Nicaragua, *Oersted;* Sinaloa, *Rose*, no. 3183.

= = Outer bracts of the involucre not membraneous-margined or colored, herbaceous to the acuminate apex.

12. M. longipes. *M. sericeum*, var. *longipes*, Gray, Proc. Am. Acad. xxii. 423 (1887). — Erect, 4 to 5 dm. high, widely branched: upper and

lower leaves entire, lance-linear, acute at both ends, 4 to 5.5 cm. long, 4 to 5 mm. broad, the middle cauline leaves deeply and pinnately 3-cleft into linear acute segments, finely pubescent above, flocculent-sericeous beneath: peduncles filiform, springing from the forks, 2 to 5 cm. long: heads 1.2 to 1.4 cm. broad (including the rather numerous well-exserted narrow bright yellow ligules): fruit tuberculate, the hood well developed and passing gradually and without intermediate toothing into a long slender spirally coiled appendage. — Jalisco, Mexico, on dry hillsides near Tequila, *Dr. Edward Palmer*, no. 391 (coll. of 1886), *C. G. Pringle*, no. 4598. Type in herb. Gray. This plant although in habit identical with *M. heterophyllum*, Lag., is strictly herbaceous and annual. This fact, together with the hooded and appendaged fruit, seems to warrant its separation. It is certainly distinct from *M. sericeum*, Lag.

++ ++ ++ Leaves undivided.

13. M. KUNTHIANUM, DC. Prodr. v. 519 (1836). *M. sericeum*, HBK. Nov. Gen. & Spec. iv. 272, t. 398 (1820), not Lag. — Of this species I have seen only a single and imperfect specimen in the De Candollean Herbarium. The leaves are linear, or nearly so, and entire; the fruit is provided with a well-developed hood but no appendage. This species also exhibits a suspicious resemblance to *M. heterophyllum*, Lag., and it may represent Lagasca's var. *β*.

14. M. DIFFUSUM, Cass. Dict. lix. 238 (1829). *M. manillense*, Less. Linnaea, vi. 155 (1831). After examining authentic material of this species in the Prodromus herbarium I can confidently refer to it Dr. Palmer's nos. 3 and 281 from Acapulco, Mexico (coll. of 1895). The species has been hitherto recorded only from the Island of Luzon. As the genus as a whole is American, and as this species is now found to be also an American plant, its occurrence in the Philippines may very likely be due to introduction. At all events it seems from the distribution of the other species more likely that this plant has been carried from Mexico to the Philippines, than the reverse.

Var. **lanceolatum.** *M. lanceolatum*, DC. Prodr. v. 519 (1836). — Fruit with a short hood but no appendage; otherwise closely like the typical form. — Collected by Nee, but the locality unknown. Nee visited both Acapulco, Mexico, and the Philippine Islands.

§ 2. ZARABELLIA, DC. Fructiferous bracts not exceeding the inclosed achenes, nor developed into a cup, hood, or appendage at the summit. — Prodr. v. 519 (1836). *Zarabellia*, Cass. Dict. lix. 240.

* Peduncles long and slender: ligules well exserted, conspicuous.

+ Leaves sericeous beneath.

++ Leaves of diverse forms, partly entire, partly cleft: Mexican.

= Peduncles long: rays conspicuously exserted: sterile flowers numerous: pales yellow-tipped.

15. M. HETEROPHYLLUM, Lag. Gen. et Spec. Nov. 33 (1816); DC. l. c. — Tantoyuca, Huasteca, *Berlandier*, nos. 741, 2161, *Ervendberg*, no. 80; between San Luis Potosi and Tampico, *Palmer*, no. 1103 (coll. of 1879).

= = Peduncles short or none: rays 3 to 4, minute: sterile flowers 1 to 3: pales purple-tipped.

16. **M. Pringlei.** Root perpendicular, long, with fibrous branches, probably annual; stem copiously branched from the base; the branches terete, purple, hirsute: leaves chiefly undivided, narrowly elliptic-lanceolate, 2 to 3 cm. long, 3 to 6 mm. broad, acutish, finely subappressed-pubescent above, snowy-sericeous beneath: lower heads short-peduncled from the forks, the upper subsessile, lateral and terminal, all small and few-flowered; outer bracts of the involucre 5, lance-linear and acute or somewhat spatulate, 3.5 mm. long, so narrow as to disclose the young fruit at an early stage in its development: ray-flowers 3 to 4; ligules very small, oval or sub-orbicular, entire or slightly 2-toothed: pales purple tipped; disk-flowers 1 to 3, mostly reduced to a clavate rudiment: fruit of the ray-flowers obovoid, strongly tuberculate, destitute of hood, cup, or appendage. — Collected by C. G. Pringle, at Las Sedas, Oaxaca, altitude 1,850 m., 15 September, 1894, no. 5722. Type in herb. Gray.

++ ++ Leaves all undivided, linear: South American.

17. M. ANGUSTIFOLIUM, DC. l. c. (1836). — Peru, *Haenke.*

+ + Leaves not sericeous beneath.

++ Slightly lignescent perennial: Lower California.

18. M. SINUATUM, Brandegee, Proc. Calif. Acad. Sci. ser. 2, iii. 144 (1891). — San José del Cabo, *Brandegee*, no. 302.

++ ++ Mexican and S. American species: annuals except *M. montanum.*

= Leaves cordate- or auriculate-clasping at the base.

19. **M. Rosei.** Erect annual, 3 to 4 dm. high; stem purplish, copiously branched almost from the base, covered with short white retrorse hairs: leaves oblong-lanceolate, attenuate, sinuately toothed, slightly narrowed to auriculate-clasping somewhat connate bases, sparsely pubescent upon both surfaces, scabrous on the margin, scarcely paler beneath, the larger about 7 cm. long, 2.5 cm. broad: peduncles in the forks of the stem, 7 cm. long, filiform, retrorsely pubescent; outer involucre 5-parted, the divisions broadly ovate or suborbicular, rounded or barely pointed at the apex, pubescent upon the back: ray-flowers 8 to 10, ligules oblong,

golden yellow, 2-toothed at the tip, about 4 mm. long; fructiferous bracts (without hood or appendage) marked with 3 rows of tubercles upon each lateral surface. — Collected by Dr. J. N. Rose between Rosario and Concepcion, Sinaloa, no. 3271. Type in herb. U. S. Nat. Museum.

Var. **subintegrum.** Leaves clasping at the base but their margins unlobed, obsoletely crenate-serrate. — Collected by Dr. J. N. Rose at Rosario, Sinaloa, 7 July, 1897, no. 1568.

20. **M. mimulifolium.** Dichotomously branched herb; stems purplish-streaked, loosely villous and finely pubescent along a longitudinal line: leaves lanceolate, acuminate, entire or obsoletely serrulate, 5 to 7 cm. long, 1.2 to 2 cm. broad, appressed-pubescent upon both surfaces, somewhat narrowed to an auriculate amplexicaul base: peduncles in the forks of the stem, 4 cm. long, filiform, covered with a fine spreading pubescence: outer involucre 5-parted; segments ovate-lanceolate, acute, somewhat accrescent, appressed-villous: ligules about 8, short-oblong, 2–3-toothed: fruit short, broad, somewhat quadrate, without hood or appendage, compressed, thin, depressed upon the lateral faces, finely tuberculate dorsally. — Collected by E. W. Nelson in the vicinity of Totontopec, Oaxaca, altitude 1700 to 2150 m., 15 July, 1894, no. 740. Type in herb. U. S. Nat. Museum. The foliage recalls that of *Mimulus ringens.*

= = Leaves neither cordate nor auriculate-clasping (except obscurely so in *M. gracile*).

a. Divisions of the outer involucre 3, ovate to ovate-lanceolate, acute or acuminate.

21. M. PANICULATUM, Gardn. in Hook. Lond. Jour. Bot. vii. 287 (1848). — Eastern and Central Brazil.

22. M. GRACILE, Less. Leaves rhombic, unlobed or panduriform, more or less narrowed to an obscurely auriculate or at least obtuse base. — Linnaea, vi. 407 (1831). — Papantla, *Schiede & Deppe;* Tantoyuca, Huasteca, *Ervendberg*, no. 92; Jalapa, *C. L. Smith*, no. 1605.

23. M. OBLONGIFOLIUM, DC. Leaves oblong to oblong-lanceolate, acute to attenuate at the base, never lobed. — Prodr. v. 519 (1836). — Vera Cruz, near Orizaba, *Botteri*, no. 809, *Seaton*, no. 461, Cordova, *Bourgeau*, no. 1628, near Tantoyuca, *Berlandier*, no. 733; Oaxaca, at San Felipe, *Conzatti & González*, no. 560; Michoacan, *Pringle*, no. 4322; Morelos, *Pringle*, no. 7321; Costa Rica, *Pittier*, no. 6963.

b. Divisions of the outer involucre 5, obliquely acuminate.

24. M. MICROCEPHALUM, Less. Linnaea, ix. 268 (1834). — This species is known to me only from Lessing's characterization and from an excellent tracing, prepared from the type at Berlin by Mr. J. M. Green-

man. It is evidently close to *M. paludosum* in habit and foliage, differing chiefly, as Lessing himself notes, in its obliquely acuminate instead of rounded or obtuse involucral bracts.

c. Divisions of the outer involucre obovate, rounded or obtuse.

1. Decumbent perennial with elliptical discolorous leaves and pale yellow rays (often tinged with purple).

25. M. MONTANUM, Benth. Pl. Hartw. 64 (1840). *M. Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xxiii. 89 (1887). — Oaxaca, *Graham*, *Pringle*, no. 4666; Chiapas, *Ghiesbreght*, nos. 174, 564; San Luis Potosi, *Pringle*, no. 3818; Cumbre de Estepà and Yavesia, *Liebmann*, no. 232.

2. Erect annuals.

26. M. TENELLUM, Hook. & Arn. Bot. Beech. 299 (1840). — Acapulco, *Sinclair*.

27. M. CUPULATUM, Gray, Proc. Am. Acad. viii. 291 (1870). — Sonora, *Palmer*, no. 20; Mazatlan, *W. G. Wright*, no. 1213; Alamos, *Palmer*, no. 726 (coll. of 1890). This species may possibly prove identical with the preceding. Both are distinguished from the following by their narrow lance-linear or oblong-linear leaves.

28. M. PALUDOSUM, HBK. Nov. Gen. & Spec. iv. 273 (1820). *M. divaricatum*, DC. Prodr. v. 520 (1836). *M. pumilum*, Benth. Pl. Hartw. 64 (1840), described from starved specimens. *M. copiosum* and *M. panamense*, Klatt in Engl. Jahrb. viii. 41, 42 (1887), founded upon trifling foliar variations without accompanying floral distinctions. *Dysodium divaricatum*, Rich. in Pers. Syn. ii. 489 (1807). *D. radiatum*, Desf. Cat. Hort. Paris, 1829, p. 182. *Alcina ovalifolia*, Lag. "Elench. Hort. Madr. 1805," Gen. et Spec. Nov. 32 (1816). *A. ovatifolia*, Jacq. f. Eclog. i. 115, t. 78 (1815?). *A. minor*, Cass. Dict. lix. 243. *Wedelia ovatifolia*, Willd. Suppl. 61 (1813). *W. minor*, Hornem. Hort. Hafn. 855 (1813). — A common weed throughout Mexico, Central America, and also occurring in the West Indies. Highly variable in leaf contour, length of ligules, etc., thus passing into many very diverse yet seemingly unstable forms.

* * Rays short, inconspicuous, exceeded by the involucre: peduncles short or none.

+ Leaves ovate-lanceolate, rounded at the subsessile base: Panama to Brazil.

29. M. CAMPHORATUM [Benth. & Hook. f. Gen. ii. 349 (1873)], Baker in Mart. Fl. Bras. vi. pt. 3, 161 (1884). *M. digynum*, Benth. & Hook. f. l. c. acc. to Hook. f. & Jacks. Ind. Kew. ii. 188. *Unxia camphorata*, L. f. Suppl. 368 (1781). *U. digyna*, Steetz in Seem. Bot. Herald, 154, t. 30 (1852–1857). — Panama, *Seemann*, and Llanos de

Cumaral, Colombia, *André*, no. 1120, to British Guiana and tropical Brazil, where apparently common.

+ + Leaves narrowed to a petiole or an exauriculate base: stems solitary.

++ Leaves rhombic to elliptic-oblong, obscurely toothed, undivided.

30. M. FLACCIDUM, Benth. Vidensk. Meddel. 1852, 86. *M. tenellum*, var. *flaccidum*, Benth. Bot. Sulph. 115 (1844). — Nicaragua near Granada, *Oersted;* Costa Rica, San Francisco de Guadalupe, *Tonduz*, nos. 7187, 8498; Tepic, Mexico, *Hinds*, *Palmer*, no. 1814 (starved specimens).

++ ++ Leaves narrow, linear-oblong and unlobed or deeply cleft into narrowly oblong segments.

31. M. HISPIDUM, HBK. Nov. Gen. & Spec. iv. 273, t. 399 (1820). *M. coronopifolium*, Sch. Bip. in Hemsl. Biol. Cent.-Am. Bot. ii. 145 (1881), without character. — Arizona, Apache Pass, and near Ft. Huachuca, *Lemmon*, nos. 331, 2795, Santa Rita Mountains, *Pringle;* Sonora, *Wright*, no. 1205; Chihuahua, *Pringle*, no. 297; Durango, *Palmer*, no. 486 (coll. of 1896); San Luis Potosi, *Parry & Palmer*, no. 444½; Jalisco, *Palmer*, no. 260 (coll. of 1886), in part; Tacubaya, *Bilimek*, no. 593, *Schaffner*, no. 195. — Except in the nature of the pubescence this species closely simulates *M. sericeum*, Lag.

+ + + Leaves obovate, narrowed to an exauriculate base: stems several from the very base.

32. **M. arvense.** Prostrate spreading annual; root fibrous; stems several, 1 to 2 dm. long, more or less branched, purplish, covered all around with short weak white hairs: leaves obovate, entire or obsoletely crenate, rounded at the apex, 3-nerved above the acuminate and slightly connate base, bright green and glabrous or nearly so upon the upper surface, distinctly paler and hispidulous upon the nerves beneath, 1.2 to 2.5 cm. long, 1 to 1.6 cm. broad: heads very small, surrounded by small ovate to orbicular foliaceous bracts and borne close in the forks of the stem and also upon such short lateral cymes as to appear axillary; outer bracts of the involucre 2, ovate, distinct at the base, obtusely pointed: ray flowers 1 to 3, disk flowers about equally numerous: fruits semi-obovate, strongly compressed, reticulated upon the sides, more or less tuberculate dorsally. — Collected by C. G. Pringle in the Valley of Mexico, Federal District, 19 October, 1896, no. 7327 (type, in herb. Gray), and in fields near Toluca, 26 September, 1892, no. 5257, also at an earlier date by Schaffner in mountains near Santa Angela. Nearest *M. bibracteatum*, Wats., but differing markedly in the contour and cuneate base of the leaves as well as in its prostrate several-stemmed habit.

+ + + + Leaves rhombic to oblong, narrowed to a sessile auriculate base.

++ Leaves oblong, relatively narrow.

= Outer involucral bracts 2, not accrescent, or scarcely so.

33. M. BIBRACTEATUM, Watson, Proc. Am. Acad. xxvi. 140 (1891). Fields, Del Rio, State of Mexico, *Pringle*, no. 3230.

= = Outer bracts 4 to 5, obtuse, united at the base into a cup.

34. M. GLABRUM, Watson. Proc. Am. Acad. xxvi. 139 (1891). — Guanajuato in valley near Irapuato, *Pringle*, no. 2821, and Jalisco near La Barca, *Pringle*, no. 3863.

++ ++ Leaves broad, mostly obovate or rhombic: outer involucral bracts 5, conspicuously accrescent.

= Outer bracts of the involucre lance-oblong, acute, distinct nearly or quite to the base.

35. M. LONGIFOLIUM, Cerv. acc. to Cav. Anal. Cien. Nat. vi. 303 (1803). *M. rhomboideum*, DC. Prodr. v. 520 (1836). — San Luis Potosi, *Parry & Palmer*, no. 444; Valley of Mexico, *Bourgeau*, no. 868, *Pringle*, no. 6455, *Harshberger*, no. 176.

= = Outer bracts of the involucre ovate, obtuse or obtusish, connate toward the base.

36. M. PERFOLIATUM, HBK. Nov. Gen. & Spec. iv. 274 (1820). — A common and well-marked weed throughout Mexico, also established in S. California at Los Angeles, *Parish Brothers*.

SYNONYMS AND DOUBTFUL OR EXCLUDED SPECIES.

M. achillaeoides, Hemsl. Biol. Cent.-Am. Bot. ii. 145 (1881) = *Villanova achillaeoides*, Less.

M. australe, Loefl. It. Hisp. 268 (1758) = *Acanthospermum brasilum*, Schrank, acc. to Hook. f. & Jacks. Ind. Kew. ii. 188.

M. Baranguillae, Spreng. Syst. iii. 619 (1826) [*M. Baranquillae*, DC. Prodr. v. 521] = *Sclerocarpus africanus*, Jacq., acc. to DC. Prodr. v. 521.

M. Berterianum, Spreng. l. c. An unrecognized and poorly described West Indian plant, very likely not of this genus.

M. brachyglossum, J. D. Smith, Bot. Gaz. xiii. 74 (1888) = *Jaegeria hirta*, Less.

M. copiosum, Klatt in Engl. Jahrb. viii. 41 (1887) = *M. paludosum*, HBK.

M. coronopifolium, Sch. Bip. in Hemsl. l. c. = *M. hispidum*, HBK.

M. digynum, Benth. & Hook. f. Gen. ii. 349 (1873), acc. to Hook. f. & Jacks. l. c. = *M. camphoratum*, Benth. & Hook. f.

M. divaricatum, DC. l. c. = *M. paludosum*, HBK.

M. Dombeyanum, DC. l. c. 521, is a still doubtful species from Peru.

M. Hildalgoa, DC. l. c. = *Hildalgoa ternata*, Llav. & Lex.

M. hirsutum, Benth. & Hook. f. l. c. acc. to Hook. f. & Jacks. l. c. = *M. camphoratum*, Benth. & Hook. f.

M. humile, Sw. Prodr. Veg. Ind. Occ. 114 (1788) = *Acanthospermum humile*, DC.

M. lanceolatum, DC. Prodr. v. 519 (1836) = *M. diffusum*, var. *lanceolatum*.

M. Liebmannii, Sch. Bip. in Klatt, Leopoldina, xxiii. 89 (1887) = *M. montanum*, Benth.

M. longifolium, Brouss. ex Willd. Enum. Hort. Berol. 934 (1809) = (?) *M. longifolium*, Cerv.

M. manillense, Less. Linnaea, vi. 155, t. 2 (1831) = *M. diffusum*, Cass.

M. ovatifolium, Reichenb. Ic. Exot. t. 42 (1827) = *M. paludosum*, HBK.

M. panamense, Klatt, l. c. 42 = *M. paludosum*, HBK.

M. pumilum, Benth. Pl. Hartw. 64 (1840) = starved *M. paludosum*, HBK.

M. ramosissimum, DC. Prodr. v. 518 (1836) = *M. cinereum*, var. *ramosissimum*, Gray.

M. rhomboideum, DC. l. c. 520 (1836) = *M. longifolium*, Cerv.

M. ruderale, Sw. Fl. Ind. Occ. iii. 1372 (1806) = *Eleutheranthera ovata*, Poit., acc. to Hook. f. & Jacks. l. c.

M. sericeum, Benth. in Oerst. Vidensk. Meddel. 1852, p. 86, not Lag. = *M. linearilobum*, DC.

M. sericeum, var. *brevipes*, Gray, Proc. Am. Acad. xxii. 423 (1887) = typical *M. sericeum*, Lag.

M. sericeum, var. *longipes*, Gray, Proc. Am. Acad. xxii. 423 (1887) = *M. longipes*, Robinson.

M. ternatum, DC. acc. to Hook. f. & Jacks. Ind. Kew. ii. 188, = *Hidalgoa ternata*, Llav. & Lex.

It must be frankly confessed that among the species here kept up the following are to the writer still doubtful: —

M. americanum, L., which, although the type of the genus, cannot be matched by any specimen from near the original station.

M. microcephalum, Less. Not as yet satisfactorily represented in the herbaria examined.

M. paludicola, Taub., the description of which suggests a *Sclerocarpus*.

M. paniculatum, Gardn., which from description is not clearly separable from *M. oblongifolium*, DC.

II. — SYNOPSIS OF THE GENUS NOCCA.

NOCCA, Cav. Icon. iii. 12, t. 224 (1795); Pers. Syn. ii. 498 (1807); La Llave & Lex. Nov. Veg. i. 31 (1824); Spach, Hist. x. 40 (1841). *Noccaea*, Willd. Spec. iii. 2393 (1804); Jacq. Frag. 58, t. 85 (1805); Spreng. Anleit. ii. 548 (1818); Less. Linnaea, vi. 695 (1831), & Syn. 151 (1832); not Moench. *Lagasca*, Cav. Ann. Cien. Nat. vi. 331 (1803). *Lagascea*, Willd. Enum. Hort. Berol. 941 (1809); Spreng. l. c. 549 (1818); HBK. Nov. Gen. & Spec. iv. 24 (1820); DC. Prodr. v. 91 (1836); Benth. & Hook. f. Gen. Pl. ii. 342; Hoffmann in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 5, 212. — Heads 1- to rarely 2-flowered, aggregated in dense campanulate or subglobose capitate glomerules; these subtended by ovate to linear more or less specialized herbaceous bracts; proper involucre calyx-like, tubular, gamophyllous, 5-toothed. Flowers alike, perfect, fertile. Corolla with narrow proper tube, enlarged cylindric throat, and 5-toothed limb, yellow to white or reddish purple, well exserted from the surrounding involucre. Style-branches long, attenuate; achenes columnar or attenuate toward the base; pappus of 2 to several short scales or rudimentary. — Annual herbs or more often shrubs, probably all natives of tropical America, a single annual species now widely distributed in the tropics. Leaves chiefly opposite. The name *Nocca* (given by Cavanilles in 1795 in honor of *Dominico Nocca*, professor of botany at Padua) is clearly the one to be employed for this genus by those who wish to apply consistently the generally conservative Berlin Rules. From the definite characterization and excellent figure given by Cavanilles there can be no doubt as to the identity of his genus *Nocca*, and the fact that the name was taken up in the same sense within fifty years by Persoon, Jacquin, La Llave, and Sweet, should establish its validity. The form *Noccaea*, adopted by various botanists from Cassini to Kuntze, may be regarded as a different spelling of the same name. Although substantive in form it has no advantage over *Nocca* commensurate with the indefiniteness which succeeds any modification of a name as originally published, and it is preferable therefore to take the name in its earliest form. While always reluctant to change any current generic name like *Lagascea*, I hesitate the less in this instance from the fact that this genus has attained no importance in horticulture or pharmacy, and its nomenclature has accordingly little or no significance outside technical systematic botany.

* Involucres 2-flowered.

1. N. BIFLORA, O. Kuntze, Rev. Gen. i. 354 (1891), as *Noccaea. Lagascea biflora*, Hemsl. Diag. Pl. Nov. 33 (1879), & Biol. Cent.-Am. Bot. ii. 139, t. 44 (1881). — Mexico, without locality, *Parkinson*, Salina Cruz, *C. C. Deam.*

* * Involucres 1-flowered.

+ Shrubs or perennial herbs: Mexican.

++ Flowers large: glomerules sessile or scarcely peduncled, even in age more or less campanulate, the subtending bracts ovate to lanceolate, large and conspicuous: central and southern Mexico.

= Leaves cordate-clasping at the sessile base.

2. N. HELIANTHIFOLIA, Cass. Stem pilose: leaves scabrous above, scabro-hirtellous beneath. — Dict. Sci. Nat. xxv. 104 (1822), as *Noccaea. Lagascea helianthifolia*, HBK. Nov. Gen. & Spec. iv. 25 (1820). *L. macrophylla*, Zucc. acc. to Steud. Nomen. ed. 2, ii. 4 (1841). *Noccaea macrophylla*, Zucc. acc. to DC. Prodr. v. 92 (1836). Acapulco, Mexico, *Humboldt & Bonpland;* Jalisco, Rio Blanco, *Palmer*, no. 664 (coll. of 1886); Guadalajara, *Pringle*, no. 1824, in part.

Var. **levior.** Stem pulverulent-puberulent, destitute of the long spreading pilosity characteristic of the typical form: leaves scabrous above, scabrous-hirtellous beneath. — Colima, Mexico, *Dr. Edw. Palmer*, no. 1148 (coll. of 1891); Zopelote, Tepic, altitude 615 to 924 m., *Lamb*, no. 561.

Var. **suaveolens.** Stem pilose; leaves soft-pubescent beneath. — *Lagascea suaveolens*, HBK. l. c. (1820). *Noccaea suaveolens*, Cass. l. c. 105 (1822). *Nocca latifolia*, Cerv. in La Llav. & Lex. Nov. Veg. i. 31 (1824). *Lagascea latifolia*, DC. Prodr. v. 92 (1836). — Tamaulipas, Santa Barbara, *Berlandier*, nos. 753, 2173; Guanajuato, *Dugès* (a form resembling the type); Oaxaca, *Nelson*, no. 1804, *L. C. Smith*, no. 964; *Conzatti & González*, no. 558, *Holway*, no. 3724; Puebla, *Conzatti*, no. 861; Vera Cruz, Mirador, *Liebmann*, no. 111; Orizaba, *Schaffner*, *Bourgeau*, no. 3342, *Botteri*, no. 499, *Gray*, Tantoyuca, *Ervendberg*, no. 317; Chiapas, *Ghiesbreght*, nos. 146, 571 (form with leaves exceptionally pubescent almost lanate beneath); Guatemala, J. D. Smith's nos. 2410, 4227.

= = Leaves short-petioled, ovate, 2 or 3 times as long as broad: flowers red or purple.

a. Indumentum of the stem spreading, dense, uniform in length, partially glandular: leaves elliptic, obtusish, remotely denticulate.

3. N. N. SP. [?]. Branches lignescent, covered throughout by a fine dense spreading pubescence, a part of the hairs glandular, others of

equal length without glandular tip, not rubescent: leaves elliptical-obtusish or very shortly acuminate, grayish-pubescent beneath, somewhat scabrous upon both surfaces, shortly but manifestly petiolate, the upper leaves much reduced, oblanceolate, acuminate, remotely denticulate, much shorter than the rather elongated internodes; secondary nerves 2 or 3, originating some distance above the base: bracts linear, acute, exceeding the flowers. — *Lagascea Moçinniana*, DC. Prodr. v. 92 (1836) as to pl. of Haenke not of Mociño. — Mexico without locality, *Haenke*, in herb. De Candolle. For an excellent sketch of this plant and information concerning it I am indebted to the kindness of Mr. Robert Buser.

b. Indumentum unknown: leaves ovate, acute, green upon both surfaces, finely serrulate with approximate purple-glandular teeth (about 10 to the centimeter).

4. N. Moçinniana, O. Kuntze, l. c. (1891), as *Noccaea Moçiniana*. *Lagascea Moçinniana*, DC. Prodr. v. 92 (1836) as to pl. of Mociño. — Mexico without locality, *Mociño*.

c. Indumentum of the stem widely spreading, composite, consisting of a dense short gray subglandular puberulence and a long white horizontally spreading villosity: leaves ovate, serrate, the margins neither purple nor glandular; both surfaces grayish-pubescent.

5. **N. Pringlei.** Stems slightly lignescent, 1 to 2 m. high, brown, in dried state striate, covered with a fine spreading gray puberulence and long spreading white villosity: leaves ovate, somewhat rigid, 5.5 to 6.5 cm. long, 3 to 4 cm. broad, serrate with about 2 teeth to the centimeter, 3-nerved from much above the base and pinnately veined, gray-tomentose upon both surfaces, especially so beneath, obtuse or acutish at the apex, rounded at the base; petiole 3 to 4 mm. long: branches of the inflorescence rigid, divergent, with long internodes and spatulate bracts; glomerules rather loose, not many-flowered: involucres 1-flowered, cylindrical, upwardly canescent-villous, 1 cm. long, cleft nearly to the middle into 5 erect very unequal teeth: corolla 1.2 cm. long, purple, covered on the outside with a fine gray tomentum; the tube very short, slender; the throat cylindrical, 4 to 5 mm. in length; teeth 5, ovate, scarcely acute: mature achene not seen. — Collected by C. G. Pringle on limestone ledges above Iguala, Guerrero, Mexico, 10 October, 1900, no. 8400. Type in herb. Gray.

d. Indumentum of the stem fine, appressed: leaves elliptic-ovate, finely or more coarsely serrate, but not noticeably purple-glandular on the margin.

1. Leaves green, lucid, and scabrous-pubescent upon both surfaces.

6. N. rigida, Cav. Ic. iii. 12, t. 224 (1795); Sweet, Brit. Fl. Gard. ser. 2, t. 26. *Noccaea rubra*, Cass. l. c. 104 (1822). *Lagascea rubra*, HBK. l. c. 24, t. 311 (1820). — Mexico, Cordillera of Guihilaque,

Berlandier, no. 1018; State of Mexico, *Bourgeau*, no. 1235, *Schaffner*, no. 293, *Pringle*, nos. 3500, 3896, 9098; Cuernavaca, *Bourgeau* no. 1205.

2. Leaves green above, niveous-sericeous beneath.

7. N. HETEROPAPPUS, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea Heteropappus*, Hemsl. Diag. Pl. Nov. 33 (1879). — Mexico, *Parkinson*, without locality; hillsides near Morelia, Michoacan, *Pringle*, no. 4541.

e. Indumentum of the stem spreading, compound, the short glandular hairs much exceeded by a long non-glandular villosity; leaves ovate-oblong, attenuate, dull and gray-pubescent upon both surfaces, even the upper ones exceeding the internodes.

8. N. tomentosa. *Lagascea tomentosa*, Rob. & Greenm. Proc. Am. Acad. xxxii. 43 (1896). — Guerrero, Mexico, between Ayusinapa and Petatlan, *E. W. Nelson*, no. 2121.

= = = Leaves oblong-oblanceolate, 4 to 5 times as long as broad, narrowed at the base to a distinct petiole.

9. N. ANGUSTIFOLIA, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea angustifolia*, DC. Prodr. v. 92 (1836). — N. W. Mexico, *Seemann*; Durango, *Palmer*, no. 853 (1896); Jalisco, *Palmer*, no. 643 (1886), *Pringle*, no. 1784.

++ ++ Glomerules slender-peduncled, usually raised much above the foliar leaves, at length subglobose, the subtending bracts mostly small and narrow.

= Teeth of the gamophyllous involucre relatively long and narrow, lance-linear to subulate.

a. Involucres soft-villous.

10. N. DECIPIENS, O. Kuntze, l. c. (1891) as *Noccaea*. *Lagascea decipiens*, Hemsl. Diag. Pl. Nov. 33 (1879), & Biol. Cent.-Am. Bot. ii. 140, t. 44, f. 1–4 (1881). — North Mexico in the Sierra Madre, *Seemann*, no. 2056; Southwestern Chihuahua, *Palmer*, no. 145 (coll. of 1885); Sonora, at Guaymas, *Palmer*, no. 256 (coll. of 1887), Alamos, *Palmer*, no. 401 (1890), La Tinaya, *Hartmann*, no. 249.

b. Involucre hirsute.

11. N. glandulosa. *Lagascea glandulosa*, Fernald, Bot. Gaz. xx. 534 (1895). — W. Mexico, head of Mazatlan River, *W. G. Wright*, no. 1305; Rosario, Sinaloa, *Lamb*, no. 483.

= = Teeth of the involucre very short (1 to 1½ mm. in length), ovate to deltoid-lanceolate.

a. Stem and floral branches pubescent to tomentulose.

12. N. Liebmannii. *Lagascea Liebmannii*, Sch. Bip. in Klatt, Leopoldina, xx. 91 (1884). — Leaves soft-pubescent beneath: involucre

finely villous, 6 to 7 mm. long: corolla 7 mm. long, puberulent, the teeth ovate. — Pochutla, Oaxaca, *Liebmann*, no. 250 (type in herb. Bot. Gard. Copenhagen; fragment and good sketch in herb. Gray).

b. **Stem and floral branches glabrous.**

13. **N. Palmeri.** Slender-stemmed shrub, with terete divaricate glabrous branches; internodes long, in dried state finely ribbed: leaves ovate, acute, scabrous both above and beneath with enlarged and indurated bases of trichomes (in the manner of many *Borraginaceae*), nearly or quite entire, 1.5 to 2.5 cm. long, abruptly narrowed at the base to a very short petiole: floral branches opposite; peduncles slender, 2 to 4 cm. long; glomerules 2.5 cm. in diameter, subglobose, about 25-headed; subtending bracts ovate-oblong to narrowly oblong, 6 to 8 mm. in length, their pubescence similar to that of the leaves; involucres terete, 10-nerved, 1 cm. long, sparingly villous; segments deltoid-lanceolate, minutely ciliated: corolla 1 cm. long, essentially glabrous; its teeth elliptic-oblong, 3 mm. in length, 2-nerved: pappus a finely fringed campanulate cup. — Collected by Dr. Edward Palmer, at Colima, Mexico, 27 to 28 February, 1891, no. 1320.

+ + **Annual: tropics of both hemispheres.**

14. N. MOLLIS, Jacq. Frag. 58, t. 85 (1809). *Lagasca mollis*, Cav. Ann. Cien. Nat. vi. 333, t. 44 (1803). *Noccaea mollis*, Cass. l. c. 103 (1822). *Lagascea Kunthiana campestris*, Gard. in Hook. Lond. Journ. Bot. v. 238 (1846). *Lagasca parvifolia*, Klatt, Ann. k. k. Nat. Hofmus. Wien, ix. 360 (1894). — Western and southern Mexico, tropical South America, West Indies, also Bengal, etc.

III. — NEW SPECIES AND NEWLY NOTED SYNONYMY AMONG THE SPERMATOPHYTES OF MEXICO AND CENTRAL AMERICA.

Dioscorea platycolpota, E. B. Uline in litt. "Glabrous throughout; stem stout, dextrorsely twisted; leaves membranaceous, orbicular-cordate, 9 to 11-nerved; ♂ racemes short, solitary, densely flower-bearing nearly to the base; flowers pedicellate, disposed in 3 to 5-flowered cymules, which in turn are closely arranged on the pendant rachis; perianth greenish yellow, campanulate, equalling or surpassing the slender pedicel; stamens three, rising divaricately from the somewhat fleshy receptacle, a little shorter than the ovate segments of the perianth; anthers extrorse. Pistillate spikes short, solitary; perianth very shortly stipitate; style

column slender, its slender, divaricate branches bifurcate at the apex; capsules small and crowded, obovate, leathery in texture; seed small, corrugated, with peripheral wing. — Collected by C. G. Pringle on limestone mountains near Iguala, State of Guerrero, Mexico, altitude 1,230 m., 15 September, 1900, no. 9224. This plant exhibits close affinities for *D. Pringlei*, Rob., the essential floral characters being identical; but the striking difference displayed in its much larger and densely crowded flowers serves to give it an entirely distinct aspect, and seems to justify a specific description. Leaves 8 to 9 cm. in diameter. Racemes 12 cm. long, with rather stout rachis. Perianth 5 mm. wide; segments 4 mm. long. Capsules 7 to 8 mm. wide."

Calochortus Pringlei. Bulb ovoid, 3.5 cm. long, covered by more or less thickened somewhat reticulated fibres, and surmounted by a cylindrical mass of long linear fuscous scales, from the midst of which rises the stem; this 4 dm. high, terete, glabrous, simple or branched, 3–5-leaved: leaves flat, linear, attenuate, the basal 3 dm. long, the cauline gradually shorter; bracts of the spathe 2, opposite, subequal, 2 to 3 cm. long, lanceolate, acuminate; pedicels glabrous, 2 to 7 cm. long; flowers 3 cm. in diameter, dark purple or almost black; sepals narrowly obovate, bluntly pointed or retuse, glabrous except at a small roundish area a little below the middle on the inner surface: petals broadly obovate, cuneate, 1.4 cm. long, two-thirds as broad, obtusely pointed, externally glabrous, internally covered on all parts except the narrowed base by rather coarse violet or yellow hairs: filaments 5 lines long, glabrous; anthers 3.5 lines long, apiculate: ovary glabrous; capsule acute at each end, 2.5 cm. long, 8 mm. in diameter. — Collected by C. G. Pringle in thin soil of the top of knobs of the Sierra de Tepoxtlan, State of Morelos, Mexico, altitude 2,300 m., 15 September, 1900, no. 8435. Type in herb. Gray. Evidently related to *C. flavus*, Schultes, f. but differing in its dark colored flowers, short and broad fruit, etc.

Mimosa acanthocarpa, Benth., var. **desmanthocarpa**. Habit, foliage, and thorns of the typical form: pods unarmed, the valves minutely fulvous-tomentose. — Collected by E. W. Nelson between San Cristobal and Teopisca, Chiapas, Mexico, altitude 2,060 to 2,620 m., 4 December, 1895, no. 3428. Type in herb. U. S. Nat. Museum; fragment in herb. Gray.

Mimosa eurycarpoides. Branches glabrous, soft-woody, with rather large pith, terete or subangular, armed by a few small scattered spines: leaves large, (including the petiole) 1.2 to 2 dm. long; pinnae 7 to 12 pairs, 3.5 to 5 cm. long, puberulent upon the rachis; leaflets 20

to 30 pairs linear-oblong, 5 to 8 mm. long, 1.6 mm. wide, acutish, oblique at the base, finely appressed-pubescent upon both sides : flowers capitate, heads globose, 1.3 cm. in diameter; peduncles filiform, 1.5 cm. long, borne by twos and threes in the axils of the upper leaves : calyx turbinate-campanulate, scarious, slightly cuspidate-toothed, 0.8 mm. long : corolla 2.3 mm. long, glabrous, not conspicuously ribbed : stamens 8 or 10 : pod 4.5 cm. long, 1.2 cm. broad, unarmed, glabrous, dark colored, oblanceolate, acute, thickish; valves not segmented. — Collected by Dr. J. N. Rose in the foothills of the Sierra Madre, near Colomas, State of Sinaloa, Mexico, 21 July, 1897, no. 1805. Type in herb. U. S. Nat. Museum; fragment in herb. Gray. To this species I should refer also Dr. Rose's no. 3157, collected on a road between Acaponeta and Rosario. While it is more copiously armed it shares all important characteristics with the plant from Colomas. The species is readily distinguished by its smooth unjointed fruit and axillary inflorescence.

Mimosa ionema. Shrub or small tree 3 to 5 m. high; branches unarmed, terete or nearly so, puberulent; branchlets green, angled and costate, tomentulose : stipules filiform, 8 mm. long, tomentulose under a lens; petioles angled, straight, puberulent-tomentulose, 4 to 6 cm. long, equalled by the foliar rachis; pinnae 4 to 6 subremote pairs, 5 cm. long, the lower ones commonly alternate; stipels 1 mm. long; leaflets about 15 pairs, oblong, obtuse, green and nearly or quite glabrous upon both surfaces, slightly paler beneath, oblique at the base, excentrically 1-nerved, pinnately veined, 1 cm. long, 3 to 4 mm. broad : flowers loosely spicate, spreading or somewhat deflexed; spikes fascicled by 3's and 4's in the axils of the upper leaves, ascending, 6 cm. long, on penduncles 2 to 3 cm. in length : corolla white or pale yellow, 2.5 mm. long, cleft to below the middle, without conspicuous nerves or ribs, glabrous; segments 4 to 5, lance-oblong, acutish : stamens 8 to 10; filaments violet-tinged : fruit (immature) narrowly oblong, acute at both ends, thin, glabrous, 5 cm. long, 7 mm. broad, about 8-seeded. — Collected by C. G. Pringle in the valley below Cuernavaca, Mexico, altitude 1,230 m., 17 October, 1900, no. 8377. Type in herb. Gray.

Mimosa Watsoni. Fruticose and probably scandent : stems subterete, tomentulose chiefly along six longitudinal lines, these bearing minute approximate subequal very short recurved spines : branchlets grayish-tomentose : petioles (including the rachis) 5 cm. long, rigid, angled, armed laterally and ventrally by 2 or 3 lines of recurved spines, tomentulose especially along the armed angles; pinnae 2 pairs; the lower bearing 1 or 2 pairs of leaflets, the upper with 2 or 3 pairs;

leaflets rhombic-ovate or obovate, lucid and finely pubescent above, tomentulose beneath, destitute of setae and ciliation, pinnately veined; the lateral 1.5 to 2.5 cm. long, subsymmetrical, the terminal twice as large, oblique and with excentric midnerve: globular heads (7 mm. in diameter) white, racemosely disposed on the long spreading unarmed grayish tomentose branches of a loose panicle; pedicels slender, 1 cm. long: corolla 4-parted to the middle, its lobes short-oblong, rounded at the apex: stamens 8: pods 5 cm. long, 7 to 10 mm. broad, glabrous and lucid upon the disarticulating valves but finely papillose under a strong lens, dark brown, unarmed except for a few scattered minute recurved spines upon the tomentulose replum; rectangular segments thin, broader than long. — Collected by the late Dr. Sereno Watson in the eastern portions of Vera Paz and Chiquimula, Guatemala, in 1885, nos. 323 in fruit and 185 in flower. Types in herb. Gray. This species of the subgenus *Habbasia* is closely related to the South American *M. Spruceana*, Benth. From this it differs, however, in the much less dense and less rufescent pubescence of the stem, more strongly armed petioles, less numerous leaflets of different venation and finally in its much smaller fruit, which is at full maturity less than half as broad as in the Brazilian plant.

Russelia Deamii. Stems becoming 1.6 m. long, 4-angled below, 6-angled toward the ends, copiously branched, glabrous except on the smaller branchlets, with slender ribs at the angles: leaves 1.5 to 2 cm. long, two thirds as wide, ovate, acute, incisely serrate except near the cuneate base, green, loosely pubescent and sparingly punctate above, slightly paler and strongly white-villous beneath especially about the larger nerves and near the base: cymes numerous, 3-flowered; peduncles slender, 4 mm. long, pubescent as are also the filiform slightly longer pedicels; bractlets linear: lobes of the villous calyx lance-acuminate from an ovate base: corolla scarlet, 1.6 to 2 cm. long, the nearly equal lobes suborbicular: fruit not seen. — Collected at Cuernavaca, Mexico, 7 July, 1900, by Charles C. Deam, no. 30. This species differs from *R. sarmentosa*, Jacq., in its villous more incisely toothed leaves and 6-angled branches, from *R. jaliscensis*, Rob., in the form of its calyx-lobes, from *R. polyedra*, Zucc., in its larger flowers and glabrous less strongly ribbed stems as well as in the form and sharp dentation of the leaves.

Russelia trachypleura. Stems 6-angled; angles prominent, rib-like, pale, roughened by small scattered callosities; areas between the ribs flat, green, glabrous or (especially near the nodes) somewhat hairy; branches usually 4-angled: leaves ternate on the stem, opposite on the

branches, elliptic-ovate, acute or acutish at each end, short-petioled, sharply serrate, green, resinous-dotted, and pubescent on the upper surface, slightly paler and pubescent upon the pinnately arranged veins beneath: flowers in short few-flowered axillary cymes: calyx-lobes ovate, caudate-acuminate, externally pubescent toward the sharp tip, 4 mm. long: corolla bright scarlet, 1.2 cm. long, with cylindrical tube and 4 short rounded subequal lobes, the upper one broader and emarginate.— Collected by C. G. Pringle on the Sierra de Tepoxtlan, State of Morelos, Mexico, altitude 2,300 m., 11 September, 1900, no. 9445. Readily distinguished from all the other species by the callosities on the rib-like angles of its stems.

Piqueria pyramidalis. Stem terete, 2 to 2.5 m. high, puberulent, green but maculate with elongated dark brown or purplish dots: leaves alternate (at least the upper ones), petiolate, broadly ovate, shallowly about 7-lobed, coarsely crenate, 3-nerved from the rounded to strongly cordate base, green and scabrous-puberulent above, paler and tomentulose beneath, the larger 1.7 dm. long and about as broad; petioles subterete, tomentulose: small and very numerous heads in pedicellate racemose glomerules; these forming a large leafy-bracted pyramidal panicle: involucral scales oblong, green, about 2-seriate, 2.5 to 3 mm. long, puberulent and covered with minute amber-colored particles upon the outer surface: corolla white, 3 mm. long, with short proper tube and relatively large throat, also bearing a few amber-colored particles: styles much exserted, clavate, purplish or brown; achenes dark-colored, glabrous, lucid, 2.5 mm. long. — Collected by C. G. Pringle in shade of cliffs on mountains above Iguala, altitude 1,230 m., 10 October, 1900, no. 8389. Type in herb. Gray. This species, although possessing all the technical characters of the genus, differs considerably in habit from the other Mexican species, being in fact nearer some of the South American.

Ageratum lucidum. Shrub with buff cortex and opposite spreading curved-ascending terete finely striate glandular-puberulent branches: leaves opposite, ovate, acutish, serrate from below the middle, thin, veiny, glabrous or early and completely glabrate upon both surfaces and lucid especially above, 4 cm. long, half as broad, ciliolate upon the margin, 3-nerved from somewhat above the abruptly acuminate shortly petiolate base, minutely white-dotted beneath and also covered with globular resinous or glandular atoms: corymbs long-peduncled (often irregularly compound), 2–6-headed and subtended by reduced opposite lance-oblong to linear sessile bracts; pedicels 1 to 2.4 cm. long, curved-ascending, 1-headed with or without 1 or more filiform bractlets; heads campanu-

late, 70–100-flowered, nearly 1 cm. in diameter; outer involucral scales linear-filiform, ciliated, the inner lance-oblong, acuminate, rigidulous, the subscarious margins erose: achenes black, 2 lines long, sharply angled, glabrous, very finely and transversely striate; pappus a shallow untoothed cup without awns. — Collected by C. G. Pringle, on mossy sides of conglomerate knobs of the Sierra de Tepoxtlan, near Cuernavaca, State of Morelos, Mexico, altitude 2,310 m., 31 October, 1900, no. 8362, and previously 15 March, 1899, no. 7851. Well marked. Type in herb. Gray.

Ageratum rhytidophyllum. Shrub with opposite terete dark red branches covered with a fine crisped cinereous puberulence: leaves opposite, subsessile, lance-oblong, 4 to 7 cm. long, 1.2 to 2 cm. broad, entire or obscurely serrate, revolute at the margin, acute at both ends, thickish, grayish green, scabrous-pubescent and strongly rugose above; veins much reticulated and prominulous beneath where covered by a dense spreading white pubescence; interstices covered by aureous particles: inflorescence of compound corymbs terminal upon the branches; bracts linear; heads rather small, 5 mm. in diameter, nodding on short glandular-puberulent pedicels, about 25-flowered; involucral scales unequal, pluriseriate, lance-linear, acute, pungent, green, striate, finely and sparingly pubescent; pales similar but narrower, rather rigid: corolla 3 mm. long, glabrous but covered with aureous particles; the proper tube greenish, about equalling the combined length of the whitish throat and lavender colored limb: achenes glabrous; pappus a short obscurely toothed cup. — Collected by C. G. Pringle on the Sierra de San Felipe, Oaxaca, Mexico, altitude 2,150 m., 5 October, 1894, no. 5675. Type in herb. Gray. Also secured in an immature state somewhat earlier (20 September, 1894) in the valley of Oaxaca by E. W. Nelson, no. 1446, and a little later (4 November, 1894) in the mountains of San Juan del Estado by Rev. L. C. Smith, no. 277.

Ageratum stachyofolium. Erect perennial with long tough filiform white roots; stem 5 to 6 dm. tall, terete, finely striate, purplish, densely covered with fine crisped white hairs: leaves elliptical, sessile or nearly so, mostly alternate, crenate, obtuse, pubescent upon both surfaces, 3-nerved, deep green above, paler green and veiny beneath, 3 cm. long, half as broad: corymbs terminal, simple, regular, 7–10-headed; bractlets filiform-spatulate; pedicels 2 to 2.5 cm. long, canescent-tomentulose; heads large for the genus, 1.2 cm. in diameter, about 100-flowered; scales of the involucre linear, acute, strongly striate, hirsute: achenes glabrous, sharply angled, dark brown, somewhat tapering toward

the base, 2 mm. long; pappus a short scarious untoothed cup without awns. — Collected by E. W. Nelson in the vicinity of La Parada, Oaxaca, altitude 2,310 to 2,620 m., 19 August, 1894, no. 991. Types in herb. Gray and herb. U. S. Nat. Museum.

Eupatorium anisopodum. Herbaceous perennial: stems terete, decumbent, flexuous, irregularly branched, puberulent especially near the nodes and under a strong lens, green or purplish tinged, 3 to 5 dm. high: leaves ovate or rhombic-ovate, opposite, 2 to 2.5 cm. long, 1.2 to 1.7 cm. broad, thickish, not punctate, crenate-serrate from the broadest portion to the acutish apex, covered above with fine short curved hairs, slightly paler beneath and appressed-pubescent upon the veins, 3–5-nerved, subcuneate at the base to a short petiole (5 mm. in length): bracts ovate-lanceolate, acute, 3 to 7 mm. long, the lower petiolate the upper sessile; heads small, 25–30-flowered, 5 to 7 mm. in diameter, not numerous, irregularly corymbose on pedicels of very unequal length; scales of the turbinate-campanulate involucre pluriseriate, very unequal, the outer short, ovate, acuminate, herbaceous, pubescent; the inner oblong, acute, pale, 2–3-nerved, ciliolate, sparingly pubescent or glabrous: corolla 2.2 mm. long, probably white, glabrous except at the limb where under a strong lens puberulent, the proper tube short, considerably exceeded by the subcylindric scarcely ampliate throat: achenes columnar, at length black, hispidulous on and between the five nerve-like angles, 1.5 mm. long; pappus-bristles 15 to 20, bright white, about equalling the corolla. — *E. pycnocephalum*, Coult. in J. Donnell Smith, Enum. Pl. Guat. ii. 94 (1891), not Less. — Collected by H. von Türckheim at Santa Rosa, Department Baja Vera Paz, Guatemala, altitude 1,540 m., April, 1887, no. 1177 of Mr. J. Donnell Smith's Guatemalan set. Type in herb. Gray. While possessing something the habit of *E. pycnocephalum*, Less., this plant is readily distinguished by its very different pluriseriate involucre.

Eupatorium araliaefolium, Less. Linnaea, vi. 403 (1831). Add syn. *E. heterolepis*, Robinson, Proc. Am. Acad. xxxv. 335 (1900).

Eupatorium Bigelovii, Gray, Bot. Mex. Bound. 75 (1859). Add syn. *E. madrense*, Wats. Proc. Am. Acad. xxvi. 137 (1891).

Eupatorium conspicuum, Kunth & Bouché, Ind. Sem. Hort. Berol. 1847, p. 13. Of this, *E. grandifolium*, Regel, Gartenflora, i. 102, t. 12 (1852), is certainly a synonym.

Eupatorium Coulteri. Stem slender, straight, terete, densely fuscous-puberulent: leaves opposite, deltoid-ovate, acute or subcaudate, somewhat hastate-lobed at the almost truncate base, shallowly dentate,

thin, harsh and slightly scabrous upon both surfaces, 4 to 5 cm. long, half as broad, minutely punctate, slightly pubescent upon the nerves; slender fuscous-pubescent petioles 1 cm. long: heads in rounded axillary and terminal thyrsoid panicles; pedicels filiform, flexuous, covered with fine spreading purple pubescence; bracts and bractlets subulate, minute; involucre turbinate, the lower much reduced scales somewhat decurrent upon the pedicels, the inner scales oblanceolate-oblong, acuminate, erose, puberulent or granular dorsally, thin, striate, often purplish-tinged; flowers about 8: corolla tubular, slightly and gradually narrowed from the summit to the base, essentially glabrous, slightly exceeding the barbellate pappus: achenes dark-colored, upwardly hispid upon the prominent angles. — *E. ageratifolium*, var. *purpureum*, Coulter, Bot. Gaz. xvi. 98 (1891). — Collected by H. von Türckheim in Coban, Depart. Alta Vera Paz, Guatemala, altitude 1,415 m., March, 1887, no. 52 of Mr. John Donnell Smith's sets. This plant differs from *E. ageratifolium*, DC., so greatly in pubescence, leaf-texture, involucre, and inflorescence that intergradation does not appear likely.

EUPATORIUM DASYCARPUM, Gray, Proc. Am. Acad. xxii. 420 (1886). Add syn. *Stevia rapunculoides*, DC. Prodr. v. 124 (1836).

Eupatorium dryophilum. Perennial from a thickish branched caudex; stems several, erect, 5 to 7 dm. high, terete, finely striate, puberulent or tomentulose, slightly scabrous, not glandular, reddish brown, branched at the summit: leaves opposite or ternate, sessile, ovate or oval, the lowest obtuse, the upper acute, all 3-nerved, shallowly few-toothed, thickish, reticulate-veiny, very scabrous upon both surfaces, entirely destitute of glands or resinous particles: heads large, 1.4 cm. in diameter, slender-pedicelled, erect; involucral scales thin, green, oval to oblong, rounded at the apex, 4–5-seriate, striate, glabrous, mealy not viscid: corollas purple, glabrous except at the short-toothed limb: pappus-bristles sordid, barbellate, very unequal; achenes dark olive, 4 mm. long, granular. — Collected by Dr. Edward Palmer, on the Rio Blanco, Jalisco, October, 1886, no. 651, and by C. G. Pringle with oaks and pines on rocky hills near Guadalajara, nos. 2171, 2323. This species is near *E. pleianthum*, Robinson, but differs from it in the absence of resinous globules upon the leaves and the presence of mealiness upon the involucre which is not viscid, also in its shorter darker achenes with fine transverse striation.

EUPATORIUM HYSSOPINUM, Gray, Proc. Am. Acad. xv. 28 (1880). Add syn. *E. koelliaefolium*, Greene, Pittonia, iii. 31 (1896). Identity exact.

EUPATORIUM LEMMONI, Robinson, Proc. Am. Acad. xxvii. 171 (1892). Add syn. *E. euonymifolium*, Greene, Pittonia, iii. 31 (1896), founded upon a co-type.

Eupatorium Gonzalezii. Apparently herbaceous and to the unassisted vision glabrous throughout; stems terete, green, finely striate, lucid, purple at the nodes, slender; the younger parts microscopically puberulent: leaves opposite, long-petioled, deltoid-ovate, obtuse, coarsely crenate-dentate, 3-nerved from the entire abruptly acuminate base, thin, bright green and glabrous upon both surfaces, 4.5 to 7 cm. long, 4 to 4.5 cm. broad; petioles slender, 3 cm. long; the uppermost leaves ovate-lanceolate, entire, shorter-petioled: heads numerous, about 18-flowered, small, in compound axillary and terminal cymes; peduncles and pedicels ascending, obscurely puberulent; bracts spatulate and mucronate to linear and acute, small; involucral scales green, striate, narrow, linear, obtuse at the scarious erose and often crumpled apex, a few of the outer considerably shorter, ovate, acuminate, ciliolate: corollas white, glabrous throughout, the greenish white proper tube somewhat exceeded by the pure white throat and spreading limb: achene dark, 1.3 mm. long, upwardly hispid on the angles; pappus pure white, sparse; the bristles essentially equal, nearly as long as the corolla, slightly connate into a minute cup at the base. — Collected by Professors C. Conzatti and V. González at El Fortin, Oaxaca, altitude 1,600 m., March, 1897, no. 387.

Eupatorium leonense. Stem 4 mm. in diameter, slightly lignescent, pithy, yellowish brown, glabrate; branches opposite, curved-ascending, striate, tomentulose, finely pubescent: leaves opposite, ovate to deltoid-ovate, long-petioled, thin, coarsely and rather bluntly few-toothed, acutish, abruptly contracted at the entire base to an acuminate attachment to the long petiole, finely pubescent when young, nearly or quite glabrate at maturity, 3 to 5 cm. long, nearly as broad, 3-nerved from a little above the base; petioles 3 to 4 cm. long, pubescent: pedicels slender, flexuous, green, puberulent; bracts minute, subulate; heads rather few in a small round-topped panicle, medium-sized, 8 mm. long, about 12-flowered; involucre campanulate, loosely imbricated, lance-linear, attenuate, very acute, green, striate, thin, sparingly white-pubescent, the outer much shorter: corolla narrowly cylindrical, of essentially uniform diameter throughout its length and without clearly marked throat or proper tube, glabrous: style-branches strongly clavate, yellow; achenes black, glabrous, lucid, 2 mm. long with conspicuous yellow callosity at the base; pappus white, equalling the corolla. — Collected by

C. G. Pringle on the Sierra Madre near Monterey, Nuevo Leon, Mexico, 16 June, 1887, no. 2277.

Eupatorium Liebmannii, Sch. Bip. in Klatt, Leopoldina, xx. 75 (1884). From the characters given and from an excellent drawing (in herb. Klatt) prepared from the original material I cannot avoid the conclusion that this is identical with the earlier *E. hirsutum*, DC., the type of which I have recently examined in the Prodromus Herbarium. The species is represented by Mr. Pringle's no. 6046 from the foothills of the Sierra de San Felipe, Oaxaca.

Eupatorium longifolium. Suffrutescent, 1 m. high: stems virgate, terete, finely striate, covered by a fine spreading purplish and probably viscid pubescence: leaves opposite, short-petioled, ovate-lanceolate, crenate-serrate, 3-nerved, thin, dark green and strigillose (under a lens) above, paler and tomentulose especially upon the veins and veinlets beneath, 1 to 1.2 dm. long, 4 to 5 cm. broad, attenuate to a caudate apex, rounded and deeply cordate at the base, the sinus narrow: inflorescences rounded-corymbose, together forming a large leafy oval or subpyramidal panicle; its branchlets, slender pedicels, and filiform bracts brown-pubescent; heads very numerous, 4 to 5 mm. long, about 10-flowered; involucral scales linear, attenuate, subequal, 3 mm. long, covered with jointed purple hairs and resinous lucid atoms: corolla scarcely 2 mm. long, gradually contracted toward the base, nearly equalled by the simple white pappus: achene dark, minutely pubescent, 1.5 mm. long. — Collected by C. G. Pringle in Tamasopo Cañon, San Luis Potosi, Mexico, 28 November, 1890, no. 3372. This number was distributed as *E. Palmeri*, Gray, to which it is obviously related. It differs, however, both in the nature of its indument and the form of the leaves. The latter are rounded at the base in *E. Palmeri* while in *E. longifolium* they are deeply cordate. *E. filicaule*, Sch. Bip., is also a nearly related species, but its heads are conspicuously racemose, which is not the case here.

Eupatorium lucidum, Ort. Hort. Matr. Dec. 35 (1797). An examination of authentic material of this briefly characterized species shows that it is just the plant to which I have recently assigned the name *E. capnoresbium*, Proc. Am. Acad. xxxv. 331, a name which must accordingly sink into synonymy.

Eupatorium Luxii. Apparently shrubby: branches subterete, striate, covered with a fine spreading and very dark pubescence: leaves opposite, elliptic-ovate (the upper ovate-lanceolate), acute to acuminate at each end, pinnately nerved, 6 to 13 cm. long, half as broad, serrate,

sparingly pubescent when young, quite glabrate except on the nerves and somewhat lucid in age, nigrescent in drying, the teeth salient, mucronulate; petioles 1.8 to 3 cm. long: heads medium-sized, about 25-flowered, 8 to 10 mm. long, in an opposite-branched corymbose panicle; involucral scales 3–4-seriate, ovate to lanceolate, acuminate, closely imbricated externally, nigrescent at the tip, pale at the base, ciliolate, silvery and lucid on the smooth inner surface: corolla-tube 5 to 6 mm. long, glabrous, gradually narrowed from the summit to the base, the teeth very short, sparingly pubescent: achenes 2 mm. long, dark, glabrous, lucid, the angles very prominent; pappus rather copious, white, nearly equalling the corolla. — Collected by Heyde and Lux at Nebaj, Depart. Quiché, Guatemala, altitude 2,150 m., April, 1892, being no. 3387 of Mr. John Donnell Smith's sets of Central American plants, and having been distributed as *E. Tuerckheimii*, Klatt, a species with much narrower leaves and linear-oblong involucral scales, glabrous stem, etc., well shown by no. 77 of Mr. John Donnell Smith's sets.

Eupatorium lyratum, Coulter, Bot. Gaz. xvi. 96 (1891), is *Conyza lyrata*, HBK.

Eupatorium Mariarum. Herbaceous; stems terete, weak, pithy, obscurely pulverulent-puberulent and also covered with scattered spreading white trichomes; branches ascending: leaves opposite, long-petioled, deltoid, acute, coarsely crenate except at the abruptly contracted base, thin, deep green and bearing a few scattered white trichomes above, somewhat paler and essentially glabrous beneath, 3-nerved from the slightly acuminate point of attachment, 5 to 7 cm. long, 4 to 5 cm. broad; petioles weak, flexuous, 3 to 5 cm. long, with a double pubescence as on the stem: heads about 25-flowered, in small axillary and terminal corymbs, pedicellate; bractlets acute, lance-linear to filiform; involucral scales linear-oblong, acute, subequal, thin, mostly 2-nerved, green, 3 mm. long: corolla (probably white) glabrous, with a slender proper tube exceeding a much broader well-marked throat and spreading limb: achenes dark-brown, slightly spindle-formed, hispidulous toward the summit. — Collected by E. W. Nelson on Maria Madre Island of the Tres Marias Group, May, 1897, no. 4244. At first taken for *E. pazcuarense*, HBK., but clearly distinct by its long petioles, different leaf-contour and dentation, also in its pubescence.

Eupatorium pachypodum. Caudex thickish, lignescent, branched; stems annual, one to several, erect, simple to the inflorescence, 3 to 4 dm. high, terete, cinereous-tomentulose: leaves opposite, small, much exceeded by the internodes, ovate to suborbicular, acute, rounded at the

essentially sessile base, serrate, 1.3 to 1.8 cm. long, nearly as broad, green and sparingly pubescent above, covered beneath by a short soft ashy more or less deciduous pubescence, and bearing upon both surfaces golden resinous particles: panicle flat-topped, its slender ascending branches and pedicels (7 to 9 mm. long) grayish-tomentulose; bractlets linear to filiform; heads about 12-flowered, 7 mm. long; involucral scales subequal, oblong, soft-pubescent and pale green upon the outer surface, 3 to 4 mm. long, obtuse: corollas white or at least pale, 4 mm. long, with slender tube somewhat exceeded by the gradually ampliated throat, glabrous: achenes 2 lines long, hispid on the angles, pappus white, equalling the corolla. — Collected by C. G. Pringle on rocky hills near Guadalajara, Jalisco, 26 May, 1891, no. 3718. Distributed as *E. scordonioides?* a species with shrubby perennial stems, deltoid-peltate leaves, etc.

Eupatorium pansamalense. Stem glabrous, rather strongly angled, striate, pithy: leaves opposite or ternate, slender-petioled, rhombic-ovate, caudate-acuminate, acute at the base, mucronate-serrate, thin, pinnately nerved, deep green and nearly glabrous except on the midnerve above, paler and puberulent or tomentulose upon the nerves and veins beneath, 1 to 1.3 dm. long, half as broad; petioles 2 to 3 cm. long: branches of the inflorescence and filiform pedicels fuscous-tomentulose; heads about 35-flowered, very numerous in a round corymbose panicle; scales of the involucre in about 3 series, narrowly oblong, acute to acutish, in a dried state stramineous except a central dark brown streak, the more or less narrowed tips thin, erose: corollas slender, without definitely marked throat, glabrous except near the limb: pappus white, equalling the corolla; achenes very small, scarcely 1.4 mm. long, glabrous. — *E. Tuerckheimii*, Coulter, Bot. Gaz. xvi. 97 and in J. D. Smith, Enum. Pl. Guat. ii. 95, as to no. 1342, not Klatt. — Collected by H. von Türckheim at Pansamalá, Depart. Alta Vera Paz, Guatemala, altitude 1,170 m., April, 1888, no. 1342 of Mr. John Donnell Smith's sets. *E. Tuerckheimii*, Klatt, differs in having much narrower oblong-lanceolate subcoriaceous short-petioled leaves which are quite glabrous upon both sides, paler beneath, and marked by a fine transverse venulation.

Eupatorium pinabetense. Shrub with angled and striate glabrous branches: leaves opposite, lance-oblong, acuminate at each end, mucronulate-serrate, smooth, green and glabrous upon both surfaces, 1 to 1.5 dm. long, 2 to 3 cm. broad, pinnately veined from a strong midnerve: smaller branches of the rather dense thyrsoid panicle fuscous-

tomentulose under a lens; heads numerous, crowded, small, about 10-flowered, short-pedicelled; scales of the involucre very few, unequal, elliptical, rounded at the apex, glabrous but erose-ciliolate, in a dried state brown: corolla glabrous or nearly so even at the limb, without clearly marked throat, equalled by the white pappus: achenes (young) pale, glabrous, 1.8 mm. long. — Collected by E. W. Nelson near Pinabete, Chiapas, Mexico, 8 February, 1896, no. 3785. This species is near but clearly distinct from *E. daleoides*, Hemsl. and *E. tepicanum*, Hemsl.

Eupatorium pleianthum. Doubtless perennial: stem slender, terete, scabrous-puberulent, finely striate, reddish brown, loosely few-branched above: leaves opposite, ovate, essentially sessile, thickish, reticulate-veiny, coarsely few-toothed, acute, cordate, 3-nerved, 2.5 to 3.5 cm. long, two-thirds as broad, slightly scabrous upon both surfaces, covered below by bright resinous globules: heads large, 2 cm. in diameter, slender-pedicelled, erect; involucral scales imbricated in 3 or 4 rows, oval to oblong, rounded at the apex, thin, glabrous and glutinous, striate, pale green, scarcely herbaceous: corollas 6 mm. long, gradually narrowed from the summit to the base, about equalled by the copious stiffish tawny pappus: styles very long and conspicuous, clavate; achenes 5 to 6 mm. in length tapering toward the base, reddish brown, covered with resinous globules, not tranversely striate. — *E. adenospermum*, var. *pleianthum*, Gray, Proc. Am. Acad. xv. 26. — Collected by Dr. Berthold Seemann, Western Mexico. Type in herb. Gray. While sharing many characters with *E. adenospermum*, Sch. Bip., this plant differs so markedly in its opposite (not alternate), shorter, ovate not oblong leaves of differing dentation that intergradation seems very unlikely.

Eupatorium prionobium. Branches ascending, terete, green, striate, puberulent: leaves opposite, petiolate, deltoid, ovate to ovate-oblong, cordate with open sinus and hastate tendency, acutish to rounded at the apex, crenate or crenate-serrate, thickish, bright green but covered with short scattered white hairs upon both surfaces, scarcely paler beneath, 2 to 4 cm. long, 1.7 to 2.5 cm. broad; petiole puberulent, 6 mm. long, sulcate upon the upper side: heads small, about 20-flowered, in round-topped sessile cinereous-puberulent corymbs; pedicels 3 to 5 mm. long; bractlets subulate; involucre green, the scales lance-oblong, acute, subequal, loosely imbricated, 2.5 mm. long, scarcely half the length of the flowers: corolla in dried specimen white, 3 mm. long, with a relatively long throat narrowed into a shorter tube, glabrous, equalled by the bristles of the pappus; these somewhat unequal, barbellate, white

but the barbules upon the lower half tipped with deep purple or violet: achenes 1.8 mm. long, upwardly hispid on the angles. — Collected by E. W. Nelson on the Sierra Madre, State of Chihuahua, Mexico, 29 September, 1899, no. 6499. Type in herb. Gray and herb. U. S. Nat. Museum. Related to *E. ageratifolium*, DC., and *E. occidentale*, Hook.

Eupatorium prionophyllum. Tree; appearing glabrous to the unassisted vision, but covered upon the branchlets, petioles, veins of the leaves, and pedicels by traces of a short close fuscous tomentum; branches curved; cortex gray: leaves opposite, slender-petioled, broadly ovate, conspicuously acuminate, usually obtuse at the base, incisely and often somewhat doubly serrate-dentate nearly from the base to the apex, thin, green on both surfaces, pinnately veined, 7.5 to 9 cm. long, two-thirds as broad; the teeth acuminate, incurved; petioles 1 to 4 cm. long: heads 25–30-flowered, in terminal opposite-branched rounded at first thyrsoid at length more open panicles; bractlets filiform; scales of the involucre imbricated in about 3 series, the outer short and ovate, acute, mucronate with a glandular tip, the inner oblong, obtusish, all striate, fimbriate-ciliolate, externally stramineous becoming purplish or fuscous in age especially near the tip, silvery and lucid within: corolla glabrous, gradually narrowed from the summit to the base: pappus white, barbellate, moderately copious, nearly equalling the corolla: achenes at maturity dark brown, glabrous, lucid. — *E. ixiocladon*, Klatt, Bull. Soc. Bot. Belg. xxxi. 190, not Benth. — Collected by Prof. H. Pittier on the banks of the river Poros, no. 1705 (type in herb. Gray) and near the Rancho Flores, no. 1900, Costa Rica. This species has no close affinity with *E. ixiocladon*, Benth., a plant well shown by Mr. J. D. Smith's no. 7501.

Eupatorium quadrangulare, DC. Prodr. v. 150 (1836). Of this, *E. thyrsoideum*, Moc., notwithstanding its supposed terete stems, is certainly a synonym. Nothing beyond the younger branchlets of *E. thyrsoideum* appears to be known, while even in the square-stemmed *E. quadrangulare* these younger branches are often subterete.

Eupatorium viscidipes. Stem slender, terete, dark-purple, minutely glandular and very viscid; branches opposite, spreading, curved upward: leaves opposite, deltoid-ovate, caudate-acuminate, crenate-serrate in the middle, 3-nerved from the obtuse or subtruncate base, 2.2 to 3.5 cm. long, 1.3 to 2.5 cm. broad, minutely puberulent above, slightly paler and punctate beneath with translucent dots; petioles 1.2 to 1.7 cm. long: heads rather numerous, small, 6 mm. in diameter, about 18-flowered, borne in a large loose corymbose leafy-bracted panicle; pedicels filiform, 3 to

13 mm. long, glandular and very viscid, covered with extraneous particles; involucre turbinate-campanulate; the scales very unequal, much imbricated, pluriseriate, the outer ovate-oblong, the inner oblong, subscarious, striate, all obtuse or rounded at the apex, glabrous or slightly glandular, viscid: corolla glabrous, white, 2.3 mm. long; the proper tube short, much exceeded by the scarcely enlarged cylindric throat: achenes nearly black, columnar, hispidulous on and between the angles; pappus bright white, a little shorter than the corolla. — *E. pycnocephalum*, Coult. in J. Donnell Smith, Enum. Pl. Guat. iv. 75 (1895), as to no. 3397, not Less. — Collected by Heyde & Lux at Chicamán, Department Quiché, Guatemala, altitude 1,230 m., April, 1892, no. 3397 of Mr. J. Donnell Smith's Guatemalan sets. Type in herb. Gray. To be distinguished from *E. pycnocephalum*, Less. by its viscidity, quite different and much more imbricated involucre, etc., and from *E. anisopodum*, described above, by its viscidity, different leaf-form, rounded instead of acute or acuminate involucral scales, etc.

Brickellia amblyolepis. Stem large, fistulose, 2 to 2.5 m. high, glabrous, purple mottled with green: leaves whorled below, opposite above, alternate in the upper parts of the open inflorescence, ovate, acuminate, 3-ribbed from the cuneate entire base, coarsely serrate from below the middle to the acuminate apex, green and glabrous above, paler and finely pubescent upon the veins beneath, 7 to 13 cm. long, half as broad; petioles 1.3 to 3.4 cm. long: heads rather large, broader than high, nodding in an open leafy panicle; pedicels bearing a few linear to spatulate bractlets; scales of the involucre in 3 to 4 series, spatulate-oblong, rounded at the apex, green and nearly glabrous except upon the deep purple tomentulose margin: corollas greenish, 5 mm. long, glabrous, nearly equalled by the rather copious purple-tinged pappus: achenes (immature) 5 mm. long, minutely pubescent; styles strongly clavate, bright orange turning to brown. — Collected by C. G. Pringle on mountains above Iguala, Guerrero, Mexico, 4 October, 1900, no. 8415. A stately species 2 to 3 metres high, not very closely related to any hitherto described. Type in herb. Gray.

Brickellia cardiophylla. Herbaceous; stem terete, glandular-pubescent; branches opposite, widely spreading: leaves ovate-triangular, acute or obtusish, entire or nearly so, broadly cordate at the base, membranaceous, 3-nerved, minutely glandular-puberulent, green upon both surfaces, scarcely paler beneath, 5 to 6 cm. long, nearly as broad; petioles slender, 2 to 3 cm. long: heads subumbellate near the ends of the branches, campanulate, 1 to 1.5 cm. in diameter; pedicels filiform, gland-

ular-puberulent, 2 to 3 cm. long, naked or bearing a single minute lanceolate bract; involucral scales appressed, imbricated in about 5 series, from ovate to linear obtusish, striate, the outer herbaceous-tipped, the inner often purplish; achenes columnar, 2.5 mm. long, minutely roughened or hispid; pappus bright white, not copious, 7 mm. in length: corollas in a dried state cream-colored. — Collected by C. G. Pringle in a barranca near Guadalajara, Jalisco, 1 May, 1894, no. 5885a. Type in herb. Gray. Near *B. floribunda*, Gray, but heads fewer and considerably larger: leaves subentire and of different contour.

Brickellia hebecarpoides. Erect herb, seemingly perennial but root not seen; stem straight, terete, striate, glandular-pubescent, copiously branched above: leaves opposite (the upper with a slight tendency to be alternate), ovate to ovate-oblong, acute or obtuse, membranaceous, finely and regularly serrate (the rameal entire or nearly so), rounded or abruptly acuminate at the 3–5-nerved often oblique base to the slender petiole, puberulent above, glandular-puberulent beneath, both surfaces green, the lower scarcely paler; branches slender, spreading, leafy: peduncles solitary in or usually a little above the forks of the branches, 1 to 2.5 cm. long, filiform, ascending or erect, glandular-pubescent, bractless; involucre 1.2 cm. long, campanulate, its outer bracts lance-oblong, acute, glandular-puberulent, herbaceous or at least herbaceous-tipped, half to two thirds the length of the lance-linear attenuate striate often purplish inner bracts; flowers about 30: corolla 1.3 cm. long, slender, glabrous, purple-tinged at least near the limb: achenes short, only 2 mm. in length, minutely pubescent; style-branches orange, strongly clavate. — Collected by C. G. Pringle in a barranca near Cuernavaca, State of Morelos, Mexico, altitude 1,540 m., 24 June, 1896, no. 7332. Type in herb. Gray. This species is related to *B. hebecarpa*, Gray, but differs in its scarcely pubescent achenes and much longer outer involucral scales, as well as in other ways.

Brickellia petrophila. Compact shrub, 3 to 6 dm. high; stems branched from near the base; branches curved-ascending, becoming erect, gray or lightish brown, covered with a fine spreading pubescence consisting of minute gland-tipped hairs and longer non-glandular hairs, the latter readily distinguishable to the unassisted vision: leaves opposite, small, reniform, ovate, crenate, obtuse, broadly and shallowly cordate at the base, 7 to 10 (rarely 28) mm. long, 1 to 3 cm. broad, somewhat rugose above, finely pubescent or even tomentulose upon both surfaces, but scarcely or not at all canescent: heads subsessile, terminal on short or more elongated branchlets either forming a cylindric racemiform or a

broader and more pyramidal inflorescence, the two forms occurring upon the same individual; involucre cylindric or in a dried state narrowly campanulate, the scales stramineous, striate, imbricated in about four very unequal series, the outer ovate, obtuse, pubescent or at least ciliate, the inner oblong-linear, acute, about 8 mm. long; flowers about 20: achenes columnar, 3 mm. long, olive brown, slightly hispid on the ribs. — Collected by C. G. Pringle on rocky hills near the city of Chihuahua, 13 October, 1885, no. 610 (type, in herb. Gray). To this species I would refer the following specimens: from San Luis Potosi, *Schaffner*, no. 365, *Parry & Palmer*, no. 351; from Guanajuato, *Dugès*, no. 449; from Zacatecas, *Deam*, no. 140; from Durango, *Palmer*, no. 753. This species is nearly related to and has been generally confused with the more southern *B. veronicaefolia*, Gray, a species which is readily distinguishable by the extremely fine canescent non-glandular pubescence of its branchlets, in which the individual hairs cannot be seen without the use of a strong lens. The involucral scales of *B. veronicaefolia* are more clcsely imbricated and in more numerous rows.

Var. **umbratilis.** Heads larger, 1.5 cm. in diameter, terminal upon more elongated branches. — Collected by Dr. Edward Palmer in a shady ravine at Parras, Coahuila, October, 1898, no. 438, and also a solitary individual in a ravine at Mapimi, Durango, no. 521.

Brickellia vernicosa. Shrub with striate buff or at length gray cortex and erect scabrous-puberulent branches: leaves alternate, ovate, serrate, acutish, bright green, coriaceous, veiny, subsessile, minutely hispidulous, glandular-punctate beneath, often vernicose, 1 to 1.7 cm. long: inflorescences cylindric thyrses 1 to 1.5 dm. long; bracts leaf-like but very small; heads subsessile, 1.2 cm. long, on short branches; involucral scales about 4-seriate, varying from ovate to linear-oblong, obtuse, minutely granular, striate: slender corollas 7 to 8 mm. long, the upper half violet: achenes slender, columnar, light-colored, 4 mm. long, upwardly hispid; pappus copious, 6 mm. long; styles yellow, only moderately clavate. — Collected by Dr. Edward Palmer at Santiago Papasquiaro, Durango, "April and August," 1896, no. 57. Related to *B. baccharidea*, Gray, but readily distinguished by its much longer achenes, etc.

Montanoa arborescens, Sch. Bip. (*Montagnaea arborescens*, DC. Prodr. v. 565). An examination of the type shows that the tips of the pales are recurved as in most of the other species of this genus and not inflexed as unfortunately described in the original characterization. The leaves are oblong-lanceolate, attenuate at each end, rather sharply

and regularly serrate near the middle and relatively narrower than in the nearly related *M. frutescens*, Hemsl. I am unable to find *M. arborescens* represented in any of the many recent Mexican collections.

Calea Pringlei. Stems terete, 6 to 9 dm. high, in dried state striate, dull brown, covered with a fine spreading or slightly reflexed tomentum of sordid color, and on young parts somewhat glandular; branches opposite: leaves broadly ovate to nearly orbicular, sessile, acute, coarsely dentate (1 to 1½ teeth to the centimeter), rugose and scabrous-puberulent above, paler green, reticulate veiny, and covered with a fine white crisped pubescence beneath: heads 8 mm. long, 3 mm. in diameter, about 10-flowered, borne on pedicels 2 to 5 mm. long in opposite-branched compound umbelliform cymes; scales of the cylindrical involucre pale yellow, striate, very unequal, rounded at the tip, the outer sparingly pubescent, small, not foliaceous nor even herbaceous; pales erose, nearly or quite glabrous: corolla nearly glabrous but covered with transparent globules, the proper tube slender and somewhat contracted to the summit where it suddenly expands into the very short throat and deeply cleft limb of five linear segments: achenes slender, somewhat attenuate toward the base, dark-colored with a violet tinge, appressed-pubescent; pappus scales about 1 mm. long, also purple-tinged. — Collected by C. G. Pringle on mountains above Iguala, Guerrero, Mexico, altitude 1,230 m., 24 October, 1900, no. 8373. Type in herb. Gray.

Calea Zacatechichi, Schlecht., var. **calyculata.** Involucre subtended at the base by 2 or 3 herbaceous-tipped bracts; these usually shorter than but sometimes exceeding the inner scarious scales. — Mexico, Nuevo Leon in the Sierre Madre near Monterey, *C. G. Pringle*, no. 2224, 16 July, 1888; also in the same locality, *C.* & *E. Seler*, no. 1080, 12 October, 1895.

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SOME NEW SPERMATOPHYTES FROM MEXICO AND CENTRAL AMERICA.

By M. L. Fernald.

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Fimbristylis melanospora. Glaucous, tufted from a hard base: leaves firm, smooth, strongly nerved, 1 to 1.5 mm. wide, tending to become involute, the longest barely 1 cm. long, with a short deltoid cartilaginous tip: culms compressed, with thin edges, 2 dm. or less high: umbel decompound, with very short rays, forming a dense inflorescence 1 to 2 cm. broad; involucre of 2 or 3 very unequal leaves, the longest not equalling the mature umbel; spikelets ovoid-oblong, 3.5 to 4.5 mm. long, 2 to 2.5 mm. thick: scales ovate, blunt, slightly carinate, pale brown with broad white scarious margins: style slender, terete, smooth, with 2 pubescent branches; achenes lenticular, obovoid, broadly rounded above, 1 mm. long, brownish black, minutely muriculate. — Vera Cruz, low grounds, Vera Cruz, April 23, 1894 (*C. G. Pringle*, no. 5773). Superficially resembling some forms of *F. polymorpha*, Boeckl., but differing in the paler and smoother leaves, the broader white margins of the scales, the very different blackish achene, and the slender (not compressed) smooth style.

F. alamosana. Low tufted annual, about 1 dm. high: leaves flat, smooth, mostly much shorter than the slender flexuous culms, rarely longer; the sheaths densely ciliate: umbels decompound, with 3 to 7 slender lax unequal rays, the longest 2 or 3 cm. long, the spikelets mostly long-pedicelled; involucre of 2 or 3 unequal leaves, the longest equalling or exceeding the rays; spikelets pale straw-colored or whitish, ovoid-oblong, acutish, 2.5 to 3.5 mm. long, 1 to 1.75 mm. thick: scales ovate, acutish, or the lowest mucronate, slightly carinate: style compressed, pubescent, with 2 branches; achene barely 1 mm. long, broadly cuneate-obovoid, with 10 or 12 obscure longitudinal bands, white, pearly and finely muriculate all over. — Sonora, Alamos, Sept., 1890 (*Edw.*

Palmer, no. 699). Differing from *F. laxa*, Vahl, in its paler smaller spikelets and smaller white and glossy achenes.

F. Holwayana. Culms slender, 1 to 3 dm. high, much overtopping the pale green narrow (0.75 mm. wide) ciliate leaves: umbel simple, with 2 (rarely 1) to 4 ovoid-oblong spikelets 6 to 8 mm. long, 2.5 to 3.5 mm. thick, the middle (or rarely solitary) one sessile, the others on slender ascending rays 0.5 to 2 cm. long; involucre of 2 or 3 ciliate leaves, the longest one usually much exceeding the rays: scales from orbicular to ovate, blunt, castaneous and shining, the green midrib in the outer somewhat prolonged into a short awn, in the others barely into a cusp: achene short-stipitate, pearly, broadly obovoid, subtruncate above, half as long as the scale, 1.25 mm. long, nearly as thick, with about 16 longitudinal ribs, and many linear transverse markings; style flat, fimbriate, exserted. — JALISCO, Chapala, Sept. 18, 1899 (*E. W. D. Holway*, no. 3443). Closely related to *F. pentastachya*, Boeckeler, but differing in its narrower spikelets and broader scales, and in the achenes which are smooth or with one or two tubercles at the very summit, not tuberculate-roughened throughout as in *F. pentastachya*.

F. obscura. Glaucous, loosely tufted from slender branching caudex: leaves flat, 2 or 3 mm. wide, the longest 1.5 dm. long, smooth, or the margins ciliolate-scabrous except at the acutish cartilaginous tip: culms compressed, with thin edges, 4 dm. or less high: umbel decompound, with 2 to 4 rays 2 or 3 cm. long and several shorter ones; involucre of 2 leaves much shorter than the umbel; spikelets mostly pedicelled, or rarely 2 or 3 fascicled and sessile, lanceolate, acute, 5 to 8 mm. long, 1.5 to 2 mm. thick: scales dark brown, ovate-oblong, strongly carinate and mucronate: style slender, terete, smooth, with 3 pubescent branches; achenes trigonous with obtusish angles, obovoid, barely 1 mm. long, whitish, with extremely obscure longitudinal markings (seen only under strong magnification). — DURANGO, alkaline bottoms near Durango, June, 1896 (*Edw. Palmer*, no. 186): SAN LUIS POTOSI, in the mountains, San Miguelito, 1876 (*Schaffner*, no. 558). Resembling *F. autumnalis*, R. & S., but clearly differing in its caespitose perennial habit, and its larger, paler, and duller achenes.

GLYPHOSPERMA PALMERI, Watson, Proc. Am. Acad. xviii. 164. Mr. Pringle calls attention to the fact that this plant, which in Mexico appears like an introduced species, is identical with the Old World *Asphodelus fistulosus*, L.

Cologania Deamii. Stems slender, 1.5 to 2 dm. long, from a slender creeping rootstock, ascending and branched, the tips flexuous but

slightly twining, covered with fuscous retrorse-hispid pubescence: stipules ovate to lanceolate, 4 to 6 mm. long: petioles retrorse-hispid, 1.5 to 2.5 cm. long; leaflets oblong-ovate to obovate, mucronate, slightly strigose above, pale and hispidulous beneath, 2 to 4 cm. long, the terminal on a petiolule (0.5 cm.) thrice as long as those of the lateral leaflets: umbels 3–6-flowered, the principal peduncles 4 to 6 cm. long, retrorse-hispid, those on the flexuous branches shorter; pedicels 1 to 1.75 cm. long: calyx 1 to 1.2 cm. long, hispid: corolla violet, 2 to 2.5 cm. long. — Morelos, Cuernavaca, July 7, 1900 (*C. C. Deam*, no. 40). Unique in its long peduncles.

Platanus glabrata. Leaves from broad-cuneate to subcordate, unequally 5–9-lobed, the middle lobe and the upper pair of lateral ones long-acuminate, the lower ones short-acuminate; the margin entire; at first closely cinereous-tomentose beneath, soon becoming glabrate: peduncles 0.5 to 1 dm. long, bearing 1 or 2 heads 1.5 to 2 cm. in diameter. — *P. Lindeniana*, Wats. Proc. Am. Acad. xviii. 155, not Mart. & Gal. — Coahuila, Monclova, Aug., 1890 (*Edw. Palmer*, no. 1269); Saltillo, April 5, 1887 (*C. S. Sargent*); by streams near Diaz, alt. 216 m., April 24, 1900 (*C. G. Pringle*, no. 8319). Differing much from *P. Lindeniana* of southern Mexico, which has the less lobed leaves permanently cinereous beneath, and the heads more numerous.

Croton Palmeri, Watson, var. **ovalis.** Leaves oval, 1.5 to 3 cm. broad, not lanceolate, rounded at base: clusters many-flowered. — Nuevo Leon, Monterey, Oct. 11, 1895 (*C. & E. Seler*, no. 1047).

Alcoceria, nov. gen. of *Euphorbiaceae* (*Hippomaneae*). Monoecious. Staminate flowers in a terminal ament; the individual flowers slightly imbedded at base by close dense pubescence. Calyx of staminate flower with 2 broad fleshy valvate sepals and a third narrow inconspicuous one. Stamen solitary; filament thick, columnar; anther 2-celled, longitudinally dehiscent, dorsally affixed toward the sheathing tip of the filament. Calyx of pistillate flower with three deltoid-subulate teeth and few or no intermediate small glands. Ovary depressed-globose, subtrigonous, the three 1-ovulate cells alternating with the calyx-teeth. Style cylindric, erect, equalling the three recurved branches. Fruit a 3-locular capsule. Seed pisiform, scarcely carunculate. — Dedicated to Gabriel Alcocer, acute observer, teacher in the Escuela Preparatoria, and botanist at the Museo Nacional and the Instituto Medico Nacional of Mexico.

A. Pringlei. Slender shrub, 3 to 5 m. high, the sprawling branches herbaceous, striate, the lower nodes remote: leaves pilose or glabrate beneath, reniform, acuminate, varying from 0.4 to 1.3 dm. long, and from

entire to more or less palmately 3–7-lobed, palmately 5-nerved, the nerves conspicuous beneath; petioles 1.5 to 4 cm. long, pubescent at tip: inflorescence axillary or terminal; the staminate ament linear-oblong, 2 cm. long, long-peduncled, with few strongly reflexed pistillate flowers at base; pedicel of pistillate flower glandular at base, thick-clavate, 1 to 2 cm. long: capsule about 1 cm. broad. — GUERRERO, limestone mountains above Iguala, alt. 1,230 m., Sept. 26, 1900 (*C. G. Pringle*, no. 8433).

Related to *Dalembertia*, Baillon, which differs in the single bract (instead of a 3-lobed calyx) at the base of the anther. Also approaching *Tetraplandra*, Baillon, and *Maprounea*, Aublet, but the former is distinguished by its four terminal anthers, and the latter by its short staminate spike and two more or less connate stamens.

Euphorbia (Anisophyllum) puberula.[1] Branching from the base, the branches subligneous, ascending, 2.5 dm. or less high, puberulent, the tips canescent and tomentulose: leaves rhomboidal, 1 to 2 cm. long, 0.5 to 1 cm. broad, very oblique, glaucous beneath, blunt, crenate-serrate, sparingly pilose; stipules setaceous: cymes dense, 1 or 2 cm. broad, terminating the leafy branches: involucre white-pilose, turbinate-campanulate, 1.5 to 2 mm. long, with deltoid hairy lobes; glands 4, short-stipitate, with or without narrow appendages; false gland absent from the broad shallow sinus: capsule appressed-pilose, subacutely lobed, 1.5 mm. long: seed pulverulent, 1 mm. long, oblong or ovoid-oblong, quadrangular, with somewhat broken ridges between the angles. — Mexico without locality (*Coulter*, no. 1438 in part): GUANAJUATO, hills of Guanajuato, 1895 (*A. Dugès*): MORELOS, Puente de Ixtla, July 3, 1900 (*Charles C. Deam*, no. 26); Huerta de la Hacienda de Miacatlan, Distr. Tetecala, Dec. 28, 1887 (*C. & E. Seler*, no. 341): OAXACA, near Mitla, Distr. Tlacolula, June, 1888; Tecomavaca, Nov. 15, 1895; Tomellin, Distr. Cuicatlan, Nov. 15, 1895 (*C. & E. Seler*, nos. 31, 1360, 1376); mountains of Oaxaca, alt. 1,750 m., July–Aug., 1900 (*C. Conzatti & V. González*, no. 1042): CHIAPAS, Ocozuquauhtla, Distr. Tuxtla, Feb. 19, 1896 (*C. & E. Seler*, no. 1952). Nearest related to *E. pilulifera*, L., and *E. lineata*, Watson, differing from the former in its terminal cymes and blunter leaves, from the latter in its rather stouter habit and more rhomboidal leaves, and from both in its cinereous puberulence.

[1] In the preparation of the descriptions of these Euphorbias the writer has been greatly assisted by Professor C. F. Millspaugh, who has generously examined the specimens, and who has already pointed out (Bot. Gaz. xxv. 13) the importance of the involucral appendages in differentiating the species of this genus.

E. (Anisophyllum) potosina. Ascending annual, branching from the base: stems glabrous, or the younger parts minutely pilose, 2 dm. high: leaves 1 to 1.75 cm. long, oblong, oblique, rounded or subtruncate at base, bluntish at tip, glabrous, pale green above, glaucous beneath, the margin coarsely appressed-crenulate; stipules deltoid-acuminate, laciniate: flowers few in small mostly terminal clusters: involucre pyriform, glabrous; the lobes elongate-triangular, entire or nearly so, the 2 flanking the broad rounded sinus much larger and lacerate; glands 4, long-stipitate; appendages very narrow or wanting; false gland aristate, rising from the base of the sinus: capsule glabrous, ellipsoidal, 2.5 to 3 mm. broad, barely 2 mm. high, the three lobes rounded: seed short-oblong, subquadrate, 1.5 to 1.75 mm. long, the dorsal angle prominent, the ventral suppressed, blackish, pulverulent, the angles and the margins of the unequal honeycomb-pits paler. — San Luis Potosi and adjacent Tamaulipas. SAN LUIS POTOSI, without locality, 1876 (*J. G. Schaffner*, no. 856, in part); region of San Luis Potosi, alt. 1,850 to 2,460 m., 1878 (*Parry & Palmer*, no. 814, in part): TAMAULIPAS, near Tula, Sept. 21, 1898 (*E. W. D. Holway*, no. 3200). — Related to *E. hypericifolia*, L., *E. Preslii*, Guss., and *E. brasiliensis*, Lam., but differing in its fewer flowers, larger capsule, and much larger differently marked seed.

E. (Anisophyllum) interaxillaris. Perennial, with slightly woody base: stems prostrate or slightly ascending, 1 dm. or so long, pilose with more or less spreading hairs: leaves short-petioled, oblong or obovate-oblong, oblique, rounded at each end, 0.5 to 1 cm. long, 4 to 7 mm. wide, minutely crenulate, mostly purple-tinged or blotched, sparingly pilose on the margins when young, soon glabrate; stipules narrowly triangular, fimbriate: flowers solitary, a single one accompanying each pair of leaves, on slender pedicels 2 or 3 mm. long: involucre campanulate, 1.5 mm. long, glabrous outside; the lobes triangular, about equal, hairy within; glands 3 or 4, brownish, mostly with suborbicular white appendages 1 mm. in diameter; the 5th gland replaced by an elongated false-lobe at the base of the shallow triangular sinus: ovary glabrous. — MORELOS, Puente de Ixtla, July 3, 1900 (*Charles C. Deam*, no. 25). Related to *E. stictospora*, Engelm., but less pubescent and with solitary flowers.

E. (Zygophyllidium) muscicola. Caudex tuberiform, globose or oblong, 3 to 5 cm. long, narrowed above to a cylindric neck: stem very slender, branching from near the base, the slender flexuous subsimple or slightly forked branches 2 or 3 dm. long, glabrous: lower leaves suborbicular to ovate, rounded or blunt; the upper elliptic-lanceolate, 0.5 to

1.5 cm. long, mucronate, entire or appressed-serrulate, glabrous or sparingly pilose-setulose; the lower equalling the capillary petioles, the upper short-petioled: flowers few, terminal and axillary, on pedicels 2 cm. or less in length: involucre short-campanulate, 2 mm. long appressed-setulose, the deltoid-oblong truncate erose lobes incurved; glands 4, dark, with pale oblong-lanceolate blunt appendages 1 to 1.5 mm. long; false gland similar: capsule rugulose, 4 mm. high: seed oblong-ovoid, minutely puncticulate, gray or gray-green, mottled with olive or brown.— MORELOS, on mossy ledges of Sierra de Tepoxtlan, alt. 2,310 m., Sept. 12, 1900 (*C. G. Pringle*, no. 8443).

E. (Cyttarospermum) calcicola. Annual, freely branching, 5 or 6 dm. high, the slender stem and branches viscid-setulose with long pale hairs: leaves broad-ovate, rounded or bluntish at tip, truncate or subcuneate at base, the lower 2 cm. long, the upper much smaller, setulose on both faces, dark above, pale beneath, about equalling the capillary petioles: flowers axillary on capillary pedicels 1 to 1.5 cm. long: involucre broad-campanulate, green and yellow, 1 mm. long, the short incurved cuneate lobes lacerate; glands 4 with 3 finger-like appendages; the false gland slightly larger, with 4 appendages: ovary glabrous.— GUERRERO, limestone mountains above Iguala, alt. 1,230 m., Oct. 5, 1900 (*C. G. Pringle*, no. 8398). Closely related to *E. astroites*, F. & M., but the stem conspicuously setulose, and the pedicels much longer.

E. LANCIFOLIA, Schl., var. **villicaulis.** Stems more or less villous with crisp jointed hairs: leaves rhombic-ovate, acutish, green and lucid above, pale and more or less villous beneath: involucre campanulate, pilose or glabrate, 3 or 4 mm. long; lobes truncate, serrate; glands 1 or 2 associate, hoof-shaped; false glands 3, columnar, truncate, one-third longer than the lobes: capsule (young) pilose, 5 mm. long, with rounded lobes: seed (young) short-oblong, 2 or 2.5 mm. long, pale brown.— CHIAPAS, mountain-slope above Ococingo, March 13, 1896 (*C. & E. Seler*, no. 2214). Distinguished from the species by its pubescence, involucral lobes, and false glands. In *E. lancifolia* the involucral lobes are fimbriate, equalling or slightly exceeding the subulate false glands.

Pernettya ovata. Branches pale brown, minutely puberulent or glabrate: leaves ovate, short-petioled, 1 to 1.5 cm. long, pale and minutely canescent-tomentulose toward the rounded base; margins finely appressed-serrate, the youngest glandular-ciliate, as are the lower faces of the young leaves: inflorescences axillary, subsessile, all the parts glabrous, the deciduous bracts sometimes with erose margins: flowering calyx 3 mm. long, cleft half-way to the base into deltoid smooth-

edged lobes: corolla ovate-campanulate, 6 or 7 mm. long. — CHIAPAS, mountain woods between San Cristóbal Las Casas and Huitztan, March 10, 1896 (*C. & E. Seler*, no. 2126[b]). Growing with *P. ciliaris*, Don, but nearer related to *P. coriacea*, Klotzsch, from which it differs in its pale and minutely puberulent branchlets, paler leaves and glandless calyx.

Arctostaphylos Conzattii. Shrub with smooth reddish bark easily peeling from the branches: leaves oblong-oblanceolate, acute, 2 to 4 cm. long, 0.75 to 1.5 cm. wide, entire and subcuneate below to a short petiole, sharply serrate above the middle, smooth and sublucid above, sparingly sordid-pilose beneath: racemes terminal, panicled, 1 dm. or less long; the rachis, pedicels and short ovate-lanceolate bracts puberulent; pedicels 1–3-bracted, 1 cm. long: calyx puberulent, with ovate bluntish lobes: corolla urceolate, glabrous, 5 or 6 mm. long. — OAXACA, Sierra de San Felipe, alt. 3,000 m., April 7 and 8, 1898 (*C. Conzatti*, no. 691). In its inflorescence resembling *A. rupestris*, Robinson & Seaton, but differing in its much smaller but more coarsely toothed leaves.

A. glabrata. Shrub with smoothish gray-brown bark; the young branches reddish-brown: leaves narrowly elliptic-oblong, acute or blunt, 2 to 4 cm. long, about 1 cm. wide, tapering to short thick petioles 3 or 4 mm. long, entire or sharply serrate with short mucronate teeth, bright green above, paler beneath, ferrugineous-tomentulose when young, becoming glabrate: racemes simple, terminal or axillary, 2 or 3 cm. long; the rachis, the lance-acuminate bracts, and the short (3 to 5 mm. long) pedicels ferrugineous-tomentose, rarely a little glandular: calyx slightly tomentulose, the lobes broadly deltoid: corolla urceolate, glabrate, 4 or 5 mm. long: berries dark, 6 or 7 mm. in diameter. — OAXACA, ledges at the summit of Sierra de San Felipe, alt. 3,500 m., Sept. 25, 1894 (*C. G. Pringle*, no. 5712), Aug. 15, 1897 (*C. Conzatti & V. González* in Exsicc. Conzatti, no. 409); mountains about Yalalag, alt. 1,850 m., Aug. 1. 1894 (*E. W. Nelson*, no. 973). Related to *A. arguta*, Zucc., but differing in its shorter leaves, and shorter simple essentially glandless raceme.

Parathesis chiapensis. Branches stout, gray and smoothish, the younger parts closely tomentose with short stellate ferrugineous hairs: leaves elliptic, 1.5 to 2 dm. long, narrowed above to a short slender acumen and below to a thick cinereo-ferrugineous petiole 0.5 to 1 cm. long; margin closely and finely crenate-dentate; upper surface smooth and dull, the lower ferrugineous-tomentose when young, becoming glabrate: panicle terminal, leafy below, in anthesis 1.5 dm. high, pyramidal, the spreading branches 3 to 6 cm. long, bearing many-flowered

corymbs, rusty tomentose and finely linear-maculate throughout; bracts lanceolate, 5 mm. long; pedicels thickish, somewhat clavate, becoming 1 to 1.5 cm. long: calyx in anthesis 3 or 4 mm. long, deeply cleft into 5 linear lobes: corolla-lobes lanceolate, 6 mm. long, strongly recurved, tomentulose within: filaments broad at base, 2 mm. long; anthers oblong-lanceolate, 3 mm. long. — CHIAPAS, in mountain-woods between San Martin and Ococingo, March 13, 1896 (*C. & E. Seler*, no. 2226). Related to *P. sessilifolia*, Donnell Smith, but differing in its crenate dull leaves, closer shorter pubescence and larger flowers.

Evolvulus Seleriana. Perennial: stems prostrate or slightly ascending, 1 to 2 dm. long, slightly branched, silky pilose, the older becoming glabrate: leaves obcordate, obovate or obovate-oblong, short-petioled, 5 to 12 mm. long, above appressed long-sericeous or glabrate, beneath permanently sericeous: flowers axillary, the filiform arcuate sericeous peduncles bractless, 9 to 13 mm. long: calyx very pubescent, 4 mm. long, with lanceolate lobes: corolla pale (apparently white) somewhat silky without, 8 to 9 mm. high. — CHIAPAS, Tuxtla, Feb. 19, 1896 (*C. & E. Seler*, no. 1926). Nearest related to *E. nummularius*, L., but with different pubescence, obcordate leaves, longer peduncles, and larger flowers.

Ipomoea caudata. Slender glabrous vine: leaves on slender petioles 3 to 5 cm. long; blade 1 dm. or less long, narrowly ovate, prolonged into a caudate-acuminate tip, the base rounded-sagittate, the basal lobes varying from blunt to acuminate, dark green above, glaucous beneath, palmately 7-nerved at base: peduncles slender, 1 to 1.5 dm. long, simple or once forked at the tip; pedicels 2 to 4 cm. long: calyx narrowly oblong, 1 cm. long, the unequal oblong blunt lobes mottled: corolla rose-purple, 0.5 dm. long, the cylindric tube 4 cm. long, the short spreading limb 2 cm. broad: style filiform, glabrous. — MORELOS, on mossy faces of the knobs of the Sierra de Tepoxtlan, alt. 2,310 m., Sept. 5, 1900 (*C. G. Pringle*, no. 8448). Habitally resembling *I. simulans*, Hanbury, but with longer peduncles and calyx, and more slender corolla.

Cordia (Sebestenoides) Seleriana. Branches straggling, covered with brown verrucose bark: leaves ovate or suborbicular, 1 to 2 cm. long, pulverulent and hispidulous; petioles slender, hispid, 3 or 4 mm. long: corymbs few-flowered, the parts very hispid; peduncles 2.5 cm. or less in length: calyx oblong-campanulate, 1 cm. long, with short rounded lobes: corolla 3 cm. long, somewhat hispidulous below, the thin ovate-oblong round-tipped crenulate lobes 1 to 1.5 cm. long. — OAXACA, dry

woods, Huilotepec, Tehuantepec, Jan. 20, 1896 (*C. & E. Seler*, no. 1779).

Salvia (Micranthae) **ageratifolia.** Tall branching annual, the sharply quadrangular herbaceous stems long-setulose, with somewhat shorter gland-tipped hairs intermixed: leaves cordate, ovate or deltoid-ovate, 2 to 4 cm. long, coarsely crenate, bluntish, dark green and minutely pilose or glabrate above, glaucous and puberulent beneath; petioles slender, 1 to 3 cm. long, more or less setulose: racemes simple, elongated, becoming 2 dm. long; verticels 2–4-flowered, the lower 1.5 to 2 cm. apart; bracts persistent, ovate-acuminate, 2 mm. long; pedicels becoming 3 mm. long: calyx at first narrowly later broadly campanulate, in anthesis 5 or 6 mm. long, 2 or 3 mm. broad, in fruit 8 or 9 mm. long, 4 or 5 mm. broad, setulose, the entire mucronate upper lip slightly shorter than the narrower acuminate lower lobes: corolla 7 or 8 mm. long, blue, the tube included, the pilose galea shorter than the lip. — OAXACA, mountains near Oaxaca, alt. 1,750 m., July, Aug., 1900 (*C. Conzatti & V. González*, no. 1049). Closely related to *S. micrantha*, Vahl, & *S. setosa*, Fernald (nos. 8 & 9 of the writer's Synopsis [1]). From the former quickly separated by its loose elongated raceme and setulose stem; from the latter by its cordate leaves, setulose stem, and scarcely secund racemes.

S. TILIAEFOLIA, Vahl, **var. rhyacophila.** Stem (especially above), petioles, and calyces densely villous: leaves more pubescent than in the species. — MORELOS, lava-fields below Cuernavaca, alt. 1,230 m., Oct. 17, 1900 (*C. G. Pringle*, no. 8381).

S. (Angustifoliae) **setulosa.** Tall (about 1 m. high) and erect shrub with stiff ascending branches; stem and especially the young branches setulose with long white hairs: leaves rhombic-oblong to deltoid, blunt, cuneate at base into slender petioles, 2 to 4.5 cm. long, 1 to 2.5 cm. broad, dark green and sparingly pilose above, pale and more or less pilose beneath, the margin finely crenate-serrate: peduncles 1 to 1.5 dm. long, sparingly setulose or glabrate: racemes becoming 2 dm. long; the ovate long-acuminate puberulent bracts 1 to 1.5 cm. long, long-ciliate on the margins, tardily deciduous: verticels 6–10-flowered, becoming remote, the lowest 3 or 4 cm. apart; pedicels 2 to 4 mm. long, canescent with appressed pubescence: calyx in anthesis 7 mm. long, hirsute especially on the tube, the ovate-lanceolate long-subulate lobes about equalling the tube, the upper lip usually tridentate: corolla deep blue, 18

[1] Proc. Am. Acad., xxxv. 489–556.

to 20 mm. long, the scarcely ampliate tube twice exceeding the calyx; the pilose lips subequal : style densely bearded. — MORELOS, mountains above Cuernavaca, alt. 2,460 to 2,620 m., Oct. 13, 1900 (*C. G. Pringle*, no. 8403), Sept. 1, 1900 (*C. G. Pringle*, no. 9204). Closely related to *S. prunelloides*, HBK. (no. 40 of the writer's synopsis), but differing from that and the other members of the group in its tall erect stem.

S. (Vulgares) igualensis. Tall (1 m. or more high), the strongly grooved quadrangular stem canescent with close pubescence: leaves broad-ovate, the lower suborbicular, short-acuminate, rounded at base, 5 to 7 cm. long, 4 to 5.5 cm. broad, coarsely crenate-serate, minutely puberulent or glabrate on both faces, pale beneath, on slender canescent petioles 1 cm. or less in length: racemes long and slender, becoming 1.5 to 2 dm. long; verticels 10–20-flowered, mostly approximate, the lower 1.5 cm. apart; bracts lanceolate, caducous; pedicels becoming 2 mm. long: calyx in anthesis about 3 mm. long, short-pilose-hispid on the nerves, with short deltoid teeth; corolla blue, pilose, 1 cm. long; the slightly ventricose tube twice exceeding the calyx; galea and lip subequal: style bearded. — GUERRERO, limestone mountains above Iguala, alt. 1,230 m., Sept. 26, 1900 (*C. G. Pringle*, no. 8418). Related to *S. brachyodonta*, Briq. (no. 59 of the writer's Synopsis) and *S. Ghiesbreghtii*, Fernald (no. 60). From the former distinguished by its coarser habit, cinereous stem, short petioles and appressed teeth of the leaves, and shorter pedicels; from the latter by its coarser habit, and broader glabrate leaves without the characteristic lanate pubescence of *S. Ghiesbreghtii*.

S. (Scorodoniae) Dugesii. Shrub, the branches canescent with closely matted simple hairs: leaves oblong or oblong-ovate, 2 to 4 cm. long, rounded at base, acute or bluntish at tip, strongly rugose, green above, canescent beneath with close simple hairs; petioles slender, 1.5 cm. or less long: racemes becoming 1 dm. or so long, simple; verticels 8–12-flowered, the lowest 1 to 1.5 cm. apart; pedicels at most 1 mm. long: calyx cuneate-campanulate, canescent with short mostly simple appressed hairs, in anthesis 7 mm. long, with short flaring blunt or merely short-subulate lobes: corolla 1.5 cm. long, pubescent with short gland-tipped hairs. — GUANAJUATO, Aug., Sept., 1900 (*A. Dugès*). This plant, known as "*Chia cimarona*," is nearest related to *S. lasiantha*, Benth. (no. 104 of the writer's Synopsis), but is distinguished by its narrow leaves, shorter pubescence throughout, larger calyx, and by the pubescence of the corolla, which in *S. lasiantha* is pilose and essentially glandless.

S. LEUCANTHA, Cav., forma **iobaphes.** Calyx and corolla both deep violet. — MORELOS, on ledges of the Sierra de Tepoxtlan, alt. 2,310 m., Oct. 14, 1900 (*C. G. Pringle*, no. 8402).

S. (Macrostachyae) **albicans.** Shrub 3 to 5 m. high, the branches cinereous-puberulent: leaves elliptic-ovate, acuminate, rounded or subcuneate at base, 4 or 5 cm. long, 2 to 2.5 cm. wide, rugulose, minutely canescent-puberulent, becoming glabrate; the margin finely appressed-serrate; petiole slender, canescent, 1 cm. or less long: racemes 3 to 10 cm. long, the verticels about 10-flowered, mostly crowded, the lower becoming 1.5 cm. apart; bracts thick and firm, densely cinereous-tomentose, ovate, acuminate, 1 to 1.5 cm. long, semi-persistent, the earliest finally deciduous: calyx cuneate-campanulate, densely white tomentose, in anthesis 8 mm. long, the short broad lobes slightly unequal, the longer upper one acute, the lower blunt: corolla 14 mm. long, canescent without; the narrow galea and the tube whitish, the broad lip deep blue: style densely bearded. — GUERRERO, limestone mountains above Iguala, alt. 1,230 m., Sept. 14, 1900 (*C. G. Pringle*, no. 8430). Nearly related to *S. Shannoni*, Donnell Smith (no. 128 of the writer's Synopsis), but the smaller thinner leaves, not tomentose beneath, and the inflorescence more canescent.

S. SESSEI, Benth. Mr. Pringle's nos. 7065 and 7080, from Cuernavaca, cited under *S. pubescens*, Benth., are not that species, but are better placed with *S. Sessei*. Mr. Pringle's no. 8378 is also referable to the latter species.

Monarda Pringlei. Simple, about 1 m. high, the stem obtusely angled, minutely and sparingly puberulent above: leaves thin, lanceolate, 7 to 9 cm. long, 1.5 to 2.5 cm. wide, subtruncate at base, the lower half rather coarsely appressed-serrate, the elongate-acuminate upper half entire, minutely puberulent on both faces, slightly paler beneath; petiole slender, puberulent, 0.5 cm. long: the glomerule terminal, 12–15-flowered; bracts like the foliage-leaves, but smaller and entire; bractlets filiform, often equalling the calyces: calyx 10 or 12 mm. long, cylindric, slightly curved, puberulent, with subulate spreading teeth 2 or 3 mm. long, and numerous crisp ascending shorter hairs in the throat: corolla vermilion, 4.5 cm. long, the slender tube long-exserted, tapering gradually to the ampliate curved throat; lips subequal, 1.5 cm. long, the narrow galea sparingly pilose. — NUEVO LEON, moist wooded cañon near Monterey, June 14, 1888 (*C. G. Pringle*, no. 2199). A handsome plant related to *M. didyma*, L., but differing in its simple habit, minute puberulence, narrow leaves, and fewer flowers.

Physalis puberula. Annual?; puberulent throughout with fine appressed or incurved white hairs: branches slender, terete below, angulate above: leaves ovate, subentire or slightly sinuate, 3 to 7.5 cm. long, 1.5 to 4 cm. broad, acuminate at tip, rounded or subcordate at base; petioles slender, 1 to 4 cm. long: peduncle 0.5 to 1 cm. long, straight but soon recurved: calyx in anthesis 6 to 8 mm. long, the deltoid-lanceolate acuminate lobes equalling the tube: corolla 1.5 to 2.5 cm. broad, sulphur-yellow with brown patches at centre: anthers yellowish: fruiting calyx ovate, 2.5 to 3 cm. long, obscurely 5-angled, slightly sunken at base, the connivent deltoid-lanceolate teeth 0.7 to 1 cm. long. — MEXICO, Sacro Monte, Amecameca, Aug. 31, 1900 (*C. G. Pringle*, no. 9147); Guadeloupe, Aug. 9, 1865–6 (*Bourgeau*, no. 724): DURANGO, Durango, 1896 (*Edw. Palmer*, no. 348). Somewhat resembling the northern *P. philadelphica*, Lam., but with persistent close pubescence and more ovate leaves. Mr. Pringle's plant was accidentally distributed as *P. Pringlei* (with incorrect authority), a name belonging to a very different plant with long glandular pubescence.

SOLANUM ROSTRATUM, Dun., var. **subintegrum.** Leaves sparingly pubescent above, shallowly sinuate-lobed, not pinnatifid: otherwise as in the species. — MEXICO, Tacuba, valley of Mexico, Sept. 18, 1900 (*C. G. Pringle*, no. 9268).

Ruellia (Physiruellia) cupheoides. Slender shrub, 1 to 1.5 m. high, the quadrangular verrucose branches covered with gray bark, the younger parts pilose: leaves elliptic-ovate or ovate-oblong, 3 to 5 cm. long, short-acuminate, pilose, on slender petioles 0.5–1 cm. long: peduncles axillary, divergent, slender, pilose and verrucose, 2 to 6 cm. long, terminated by a single flower or branching and bearing 2 flowers; bracts 2, linear-spatulate, in age becoming 1.5 cm. long: calyx pilose, 1.5 to 2 cm. long, cleft two-thirds to the base into lanceolate or ovate-lanceolate acuminate ciliate lobes: corolla tubular, 3.5 cm. long, yellow or reddish, with short erect blunt greenish lobes; the slightly narrowed tube shorter than the calyx: stamens subequal, included; filaments glabrous; anthers linear-oblong, 4 or 5 mm. long: style bearded; capsule oblong-obovoid, short-pointed, equalling the calyx, glabrous; seeds four, thin, ovate, 0.5 cm. long, dark, with narrow pale margin. — GUERRERO, limestone mountains above Iguala, alt. 1,230 m., Sept. 27, 1900 (*C. G. Pringle*, no. 8409).

Valeriana retrorsa. Slender, 2 to 4 dm. high, from a small oblong tuber; stem densely retrorse-hispid below, glabrous above: leaves 3 to 5 cm. long, the basal short-petioled, the upper sessile; leaflets 3 to 5 pairs, linear-lanceolate, blunt, the lowest pair minute, the terminal leaflet much

larger, often 3 cm. long, mostly entire: inflorescence 3 to 6 cm. high, a trichotomous loose cyme; flowers rather crowded at the tips; floral leaves linear: corolla funnel-form, 6 mm. long, the lobes barely 1 mm. long: stamens and style slightly exserted: fruit hirsute. — MORELOS, mossy rocks, Sierra de Tepoxtlan, alt. 2,310 m., Sept. 5, 1900 (*C. G. Pringle*, no. 8454). Resembling *V. mexicana*, DC., but with hispid stem, narrower leaves, and longer corolla.

Lobelia regalis. Stem tall and stout, softly white-tomentose, almost lanate, above: leaves lanceolate to ovate-oblong, 1 to 2 dm. long, 4 to 8 cm. broad, subentire or minutely denticulate with pale hard teeth, pale green above, at first tomentulose, later glabrate, densely canescent-tomentose beneath; petioles slender, canescent, 2 or 3 cm. long: peduncles white-tomentose, axillary, ascending, becoming 5 or 6 cm. long: calyx hemispherical, canescent, 8 to 12 mm. long, cleft half-way to the base into remote lanceolate lobes: corolla 3.5 to 4.5 cm. long, bright red, canescent-tomentulose without, the lips subequal: filaments pilose-hispid; anthers 6 or 7 mm. long, glabrous except at the long-hirsute tip. — OAXACA, Cuicatlan, alt. 555 m., Dec. 2, 1895 (*L. C. Smith*, in exsicc. C. Conzatti, no. 105); between Tlacolula and San Dionisio, Chichicapa, Jan. 3, 1896, and bed of the river Tehuantepec, below Totolapam, Yauhtepec, Jan. 4, 1896 (*C. & E. Seler*, nos. 1673, 1669). Related to *L. laxiflora*, HBK., but differing from that in its much larger petioled leaves and its denser white pubescence.

L. Nelsonii. Shrub with hard ligneous branches covered by smooth gray bark; branchlets bearing irregular areas of leaf-scars; young leaf-bearing branchlets smooth or hispidulous: leaves firm, ovate-lanceolate, 4 to 7 cm. long, 1 or 2 cm. wide, mostly long-acuminate, narrowed below to a short petiole, sharply and irregularly serrate, minutely and sparingly hispidulous: peduncles hispidulous, 1.5 to 4 cm. long, few at the tips of the branches: calyx glabrous, hemispherical, with linear-lanceolate lobes 3 or 4 mm. long: corolla red, 2.5 to 3 cm. long, glabrous within and without: filaments glabrous; anthers 7 mm. long, glabrous except at the bearded tip. — JALISCO, oak woods at 1,380 to 1,694 m. alt., near Huachinango, March 4, 1897 (*E. W. Nelson*, no. 4009). A unique species in Mexico.

L. GRUINA, Cav., var. conferta. Coarser and generally more branching than the species: racemes densely flowered, not secund, at first short and capitate, later becoming loose and elongated. — DURANGO, abundant by a creek, Dos Cajetes, alt. 2,620 m., Nov., 1896 (*Edw. Palmer*, no. 810): formerly collected by *Gregg* in 1848–49, but without record of locality (no. 392).

Heterotoma Goldmanii. Annual or biennial, freely branching from the base, 5 dm. high; the slender branches minutely hirsute below with short hairs: leaves mostly toward the base of the plant, thin, lanceolate to ovate, irregularly cut and lobed half way to the middle, 2 to 4 cm. long, on slender petioles one half as long as the blade: racemes elongated, slender and flexuous, pedunculate, loosely-flowered, becoming 2 to 4 dm. long; pedicels filiform, spreading, at first 1 cm. long, in fruit becoming 5 cm. long; bracts subulate, the lowest 1 cm. long, the upper much shorter: calyx hemispherical, glabrous, in fruit 2.5 mm. long, hardly equalling the lance-subulate teeth, and with a linear spur 5 mm. long, bearing 2 subulate awns at the tip: corolla blue, 1.5 cm. long, the posterior portion elongated and adnate to the spur of the calyx; tube cleft nearly to the base; the 3 middle lobes of the limb much larger than the lateral ones. — SINALOA, road from Las Flechas to La Rostra, Feb. 22, 1899 (*E. A. Goldman*, no. 324). Nearest related to *H. macrocenteron*, Benth. in Hook. Ic. xii. 68, t. 1177, but with smaller flowers, looser more spreading inflorescence, and different leaves.

H. stenodonta. Perennial from a slender rootstock: stems slender, glabrous, 3 dm. or less high, leafy to the top: leaves ovate-lanceolate, long-acuminate, 1 dm. or less long, 1.5 to 3.5 cm. broad, thin and glabrous, except for the entire cuneate base, sharply and irregularly serrate with erect narrow-deltoid callous-tipped teeth: racemes terminal or on axillary peduncles, becoming 6 or 7 cm. long; pedicels filiform, ascending, 1 cm. or so long, twice exceeding the subulate minutely toothed bracts: calyx campanulate, the tube in fruit 3 or 3.5 mm. long, about equalling the lanceolate teeth: corolla pale bluish, 8 mm. long, merely gibbous at base: capsule oblong, one-half exceeding the calyx-teeth. — CHIAPAS, Chicharras, alt. 923 to 1,847 m., Feb. 6, 1896 (*E. W. Nelson*, no. 3758).

Brickellia glomerata. Stems closely cinereous with short more or less viscid pubescence, freely branched above: leaves opposite, petioled, ovate to oblong, acute or bluntish, the lower excluding the petioles 8 cm. long, the upper shorter, strongly rugose, scabrous above, tomentulose beneath: heads sessile or subsessile in the upper axils or in terminal leafy-bracted glomerules of from 2 to 5: involucre oblong, 1 to 1.2 cm. long, of about 4 series of oblong or oblong-lanceolate blunt greenish or purplish-brown dark-nerved hardly scarious bracts, the outer and the margins of the inner pilose or arachnoid: achenes linear, 4 mm. long, strongly appressed-pubescent. — GUERRERO, oak woods, higher mountains near Acapulco, Jan., 1895 (*Edw. Palmer*, no. 497): OAXACA,

between Panixtlahuaca and Juquila, alt. 923 m., Feb. 26, 1895 (*E. W. Nelson*, no. 2391); in oak- and pine-woods, San Carlos, Yauhtepec, Jan. 5, 1896, and in mountain-woods between San Carlos and San Bartolo, Jan. 6, 1896 (*C. & E. Seler*, nos. 1765, 1655); previously collected at San Bartolo by *Liebmann* (no. 399), whose specimen has been referred by Dr. Klatt to *B. hebecarpa*, Gray. The present species, however, differs from that as from the other related species in its glomerulate heads and barely scarious involucre.

Xanthocephalum megalocephalum. Perennial from slender running rootstock: stem glabrous, glutinous, 3 or 4 dm. high, bearing 3 or 4 large solitary heads at the tips of long branches: leaves entire, resinous-punctate, the lower spatulate and petioled, about 1 dm. long, the upper lanceolate, sessile and shorter: involucre broad-hemispherical, 10 or 12 mm. high; the outer bracts lanceolate, with herbaceous tips, the inner oblong and blunt, mostly chartaceous: rays oblanceolate, blunt, 2 cm. long: achenes glabrous; pappus a crown of minute pales. — CHIHUAHUA, Mt. Mohinora, Sept. 1, 1898 (*E. W. Nelson*, no. 4890); Sierra Madre near Guachochi, alt. 2,100 m., Sept. 27, 1898 (*E. A. Goldman*, no. 174). Related to *X. Alamani*, Benth. & Hook., but much larger throughout.

Bigelowia Nelsonii. Shrub with rough dark gray bark; branches rigid and ascending, conspicuously glandular-punctate: leaves crowded, linear, submucronate, conspicuously glandular-dotted, 0.5 to 1.5 cm. long: heads solitary, subsessile at tips of short lateral leafy branches: involucre 1 cm. broad, many-flowered, the 3 series of glandular bracts thin, linear-attenuate: achenes long-silky. — CHIHUAHUA, in the Sierra Madre, Sept. 29, 1899 (*E. W. Nelson*, no. 6494). Resembling *B. brachylepis*, Gray, but with much broader heads, and thinner attenuate involucral bracts.

Solidago Pringlei. Stem puberulent or minutely pilose, with few ascending branches, very leafy: leaves linear or elongate-lanceolate, narrowed below to a slender sub-petiolar base, and above to an acuminate tip, 0.5 to 1.3 dm. long, 3 to 7 mm. wide, the midnerve prominent, and two lateral ones sometimes apparent, finely appressed-serrulate or subentire, with ciliate margins, puberulous above, finely pilose beneath: panicles elongate, narrow, 1 to 1.5 dm. long, 2 or 3 cm. broad, secund, the tips slightly recurved: involucre 4 mm. high; bracts glabrous, linear, the outer acutish, the inner blunt: achenes pubescent. — NUEVO LEON, in the Sierra Madre, near Monterey, Aug. 22, 1889 (*C. G. Pringle*, no. 2886). Resembling *S. rupestris*, Raf., but with

more elongated leaves, narrower more secund panicles and much larger heads.

Conyza lyrata, HBK., var. pilosa. Branches and younger leaves long-pilose with pale hairs, almost if not quite lacking the viscid character and the glands of the species.— Chiapas, on the border of a lake, Tonalá, Paredon, Feb. 8, 1896 (*C. & E. Seler*, no. 1879).

Pectis Lessingii, Fernald, Proc. Am. Acad. xxxiii. 67, a species formerly known only from Florida and the West Indies, was collected at Nicoya, Costa Rica, in December, 1899, by A. Tonduz (no. 13791).

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I. — THE NORTHEASTERN CARICES OF THE SECTION HYPARRHENAE.

The Carices of Koch's subgenus *Vigneae*, with its sections *Acroarrhenae* and *Hyparrhenae* of Fries, have always perplexed the systematist, and by the general student they have as a rule been ignored or vaguely referred to such characteristic species as *Carex straminea* or *C. echinata*. Recently, however, the generally widening interest in systematic botany has brought together in *Carex*, as in other groups, a large mass of material; and an attempt to identify these specimens has made it necessary to study in great detail the minuter but tolerably constant characteristics of the fruiting plants.

In general, the classification of Carices has always been based upon characters in the inflorescence; and although the detailed study of the perigynia (or utriculi) has been the final resort of the specialist, an attempt has been made in our manuals to separate species as much as possible upon the more obvious characters of the inflorescence. Thus *Carex scoparia* is described in the two current manuals as having the spikelets (spikes) "all contiguous or bunched" or "usually aggregated;" while in only one of these works is Boott's var. *minor* given recognition, and there as a mere dwarf variety. Yet in plants which are undoubtedly *C. scoparia* the spikelets are often scattered, forming a loose moniliform spike; and the northern plant described by Boott as var. *minor* has a distinct range and unique habitat, while its minute thick-bodied perigynia distinguish it at a glance from the more southern species with which it has been associated.

The case of *Carex scoparia* is only one of many in which the attempt to rely upon superficial characteristics has led us to confuse plants

which are genetically very distinct. Consequently, as stated, an attempt has been made to get at a more satisfactory basis for classification by studying the characteristics of the perigynia, which, naturally, are subject to less variation than is the superficial aspect of the inflorescence as a whole. But since variations in texture and nerving, which are perfectly evident upon comparison of specimens, are extremely difficult to render clear in descriptions, it has been found advisable to employ as the primary basis of division, at least in the groups here discussed, the actual or proportional measurements of the perigynia or the achenes. Even this method of careful measurement may sometimes prove misleading, but in most species the perigynia vary within certain clearly defined limits, and it is only the very exceptional individual which will not fit the system here proposed. And, although in rare cases a species thus presents perplexing forms in which the perigynia are not characteristic, many attempts to classify the members of this group have convinced the writer that by actual measurement alone can we safely identify plants of such strong outward resemblance as *Carex straminea*, *C. scoparia* and *C. tenera*, or *C. alata* and *C. albolutescens*.

As a result of these studies it has been found desirable to treat many plants in a manner somewhat different from that in any current synopses of the genus, and in some cases a study of the original descriptions and specimens has brought the writer to conclusions very different from those generally accepted by American caricologists. Some of these points are of slight significance, others of fundamental importance; and, since it is inadvisable to complicate the synoptic treatment of the species with detailed discussions as to the identity and synonymy of different forms, the more important questions may be here discussed.

Carex scoparia, Schkuhr, presents little difficulty, as the original figure is unmistakable. The species has, however, been made to harbor plants of very different aspect; and a study of the fruiting characters shows these to fall into three groups with marked and constant characteristics. *C. scoparia*, itself, has the perigynium very thin and scale-like, with the wings so strongly developed as to minimize the apparent thickness of the body. This plant in its different forms is of broad range south and west of the Gulf of St. Lawrence.

The other two species which have been included with *Carex scoparia* have the narrower subulate or elongate-lanceolate perigynia so little winged as quite to lack the scale-like character seen in that species. The best known of these two plants is the form described by Francis Boott as *C. scoparia*, var. *minor*. The material from which Boott's

plate was drawn was collected by Tuckerman at the base of the White Mountains; and since it is necessary to distinguish the plant by a new specific name (*minor* having been used too often as a varietal name to be eligible) and since there is already a *Carex Tuckermani*, it is a pleasure to commemorate the explorations and generous services of the Crawford family, familiar to a long generation of visitors to the White Mountains. This plant with which their name now becomes associated is common in northern New England and about the Great Lakes, thence extending far northward.

The other plant with narrow thick perigynia is more puzzling. In the dark brown color of its broad scales it is unlike the other forms which have been referred to *Carex scoparia*. In fact, by different students it has been referred with doubt to *C. tribuloides*, *C. lepornia*, and *C. foenea* as well. Yet in its perigynium it resembles only Boott's *C. scoparia*, var. *minor*. This tall dark-spiked plant, which is common in the region of Orono, Maine, has been collected by Professor Lamson-Scribner and by the writer, but it seems to be unknown from other regions. This fact immediately suggests that it may be an introduced form, but a careful search through Old World material and descriptions fails to show anything to which it can be referred. It is, therefore, here treated as a local species, taking the name of the town from which all our material has been collected.

One other form of the *scoparia* group should be specially mentioned since, by an unfortunate misinterpretation, it has already caused needless confusion. This is *Carex scoparia*, var. *moniliformis*, Tuckerman. A specimen in the Gray Herbarium from Tuckerman himself, is without question a slender-spiked form of *C. scoparia*. The variety was so treated by Francis Boott, in whose table 368 it is well represented. Yet in his Preliminary Synopsis of the genus Professor Bailey treated it without question as identical with his own *C. tribuloides*, var. *reducta*; and Professor Britton, following his lead, has since made the new combination, *C. tribuloides*, var. *moniliformis* (Tuckerman) Britton, for a plant very different from that to which the varietal name was originally applied.

Carex tribuloides, Wahl., has been clearly treated by Professor Bailey.[1] *C. Bebbii*, Olney, however, which by him is reduced to a variety of that species, seems to be as well marked as other members of the subgenus, and it is here given equal rank with them. In its shorter, broader, and

[1] Mem. Torr. Cl., I. 54.

thicker perigynia it is more nearly related to *C. straminea* and its allies. So, likewise, *C. cristata*, Schwein., is reinstated as a species, since its tolerably constant habit and its shorter, firmer perigynia place it as near *C. straminea* as to *C. tribuloides*.

The diverse plants which have been treated by various authors, now as distinct species, now as forms of *Carex straminea*, fall into groups which are, in the main, fairly free from complexity. The attempt to separate these forms by color-characters has naturally led to much confusion, for plants which in bright sunlight have a strongly marked ferrugineous tendency, in shade are often quite green. The shape, size, nerving, and texture of the perigynia, however, show that almost without exception the species proposed by Willdenow, Schkuhr, Torrey, Schweinitz, Dewey, and other early students of the group were based on permanent characters. To treat all these well marked and constant forms as varieties of one species is adding confusion rather than clearness to our interpretation of the genus, especially when several of them are as closely related to other well recognized species.

The identity of Willdenow's *Carex straminea* was settled by Professor Bailey[1] in 1889, and a recent examination of Willdenow's material by Dr. J. M. Greenman has verified Professor Bailey's conclusions. *C. albolutescens*, Schweinitz, is now well understood, as are likewise *C. mirabilis*, Dewey, *C. tenera*, Dewey, *C. Bicknellii*, Britton (*C. straminea*, var. *Crawei*, Boott), and *C. alata*, Torrey. But *C. festucacea*, Schkuhr, *C. straminea*, var. *brevior*, Dewey, and *C. foenea*, var. β, Boott, seem to have been less clearly understood.

Schkuhr's *Carex festucacea*, according to the original description, was a plant with about eight spikelets subapproximate or in a loosely cylindric spike, and the species is so represented in Schkuhr's figure. It is likewise well represented by Dr. Boott, who apparently had a clear conception of the species, in his table 386. Schkuhr's *C. straminea*, which we now know to be different from Willdenow's plant of that name, was an extreme form of *C. festucacea* with fewer spikelets, and until recently it passed as the type of the species; i. e., *C. straminea* (*typica*) of Boott and others. This plant, however, was called by Dewey *C. straminea*, var. *brevior*, and under that name it has been treated by Professor Bailey. He includes with it, though, the *C. festucacea* of Schkuhr, a plant which, though closely related, is of rather marked appearance and of more limited range. More recently Dr. Britton, in

[1] Mem. Torr. Cl., I. 21.

restoring to specific rank *C. festucacea*, has included in it Dewey's *C. straminea*, var. *brevior*, and in the Illustrated Flora he figures the latter plant under the former name. But the late Dr. Eliot C. Howe, in his admirable treatment of the New York Species of Carex, has recognized both plants, thus following the general treatment of Francis Boott and other earlier writers and at the same time clearing the names *festucacea* and *brevior* from the confusion which has recently surrounded them.

Carex foenea, var. β of Boott has had a peculiarly unsettled history. When Francis Boott described and figured the plant as a variety of *C. foenea*, the latter name applied to *C. albolutescens*, Schweinitz, not to the true *C. foenea* of Willdenow. It was Boott's opinion, then, that the slender brown-spiked plant of the interior was a phase of what we now know without much doubt to be *C. albolutescens*. In the fifth edition of the Manual Dr. Gray took up *C. foenea*, var. β as *C. foenea*, var. (?) *ferruginea;* and later the plant was distributed by Olney as a variety of Dewey's *C. tenera* (*C. straminea*, var. *aperta*, Boott). In his Preliminary Synopsis in 1886, Professor Bailey reduced it to synonymy under *C. straminea*, Schkuhr (not Willd.), and later in his Critical Studies of Types he treated this plant along with *C. festucacea*, Schkuhr, and *C. straminea*, var. *Crawei*, Boott (*C. Bicknellii*, Britton) as identical with *C. straminea*, var. *brevior*, Dewey (*C. straminea*, Schkuhr, not Willd.). Subsequently, however, he has taken out of his *C. straminea*, var. *brevior*, two plants, which he treats as parallel varieties, var. *Crawei*, Boott, and var. *ferruginea* (*C. foenea*, var. β, Boott); and at the same time he has discussed as a species *C. albolutescens*, Schweinitz (*C. foenea* of authors, not Willd.). This course has greatly cleared the group from its former confusion; but it is unfortunate that while separating *C. albolutescens* specifically Professor Bailey should have attached *C. foenea*, var. β to the slender usually flexuous-spiked *C. straminea*, whose identity he had already so carefully worked out. *C. foenea*, var. β in its stiff habit, its strongly appressed broad-ovate perigynia, and the texture of its leaf-sheaths, is quite unlike that species, but is very close to *C. albolutescens* with which it had been placed by Francis Boott. In these characters, likewise, it is equally close to *C. alata*, Torr., while its perigynia and the occasional awn-tips of the scales are so like those of the latter species as to place it nearer to that than to the former plant.

The two species, *Carex foenea*, Willd., and *C. adusta*, Boott, have already been discussed and very clearly settled by Professor Bai-

ley.[1] But his own *C. foenea*, var. *perplexa* has proved very puzzling to students of the group. In the original description of this variety at least two distinct species are referred to, while the words "head erect or nearly so" have proved misleading for a plant with more flexuous spikes (heads) than ordinarily occur in the type of the species.

Dr. J. M. Greenman has kindly compared with Willdenow's original material various plants passing in America as *Carex foenea*, and he has furnished the writer with detailed camera-drawings from Willdenow's material. From these comparisons there seems no doubt that the original *C. foenea* was, as Professor Bailey has already stated, the smallest form of the species, with 4 to 9 spikelets in a suberect linear-cylindric spike. This is the plant subsequently described by Tuckerman as *C. argyrantha* and figured by Boott in his table 382, fig. 2.

Professor Bailey's *Carex foenea*, var. *perplexa* was based on Boott's table 380 and a portion of table 382 (presumably fig. 1), upon Olney's *C. albolutescens* (Exsicc. fasc. 1, no. 8), as well as his *C. albolutescens*, var. *sparsiflora* (fasc. V. no. 11). Now, the perigynia of good *Carex foenea* are strongly and conspicuously nerved on both faces, and the spikelets are pale green or silvery brown. The first part of var. *perplexa* (Boott's table 380) shows a perigynium quite nerveless or only faintly short-nerved on the inner face; the second component (table 382, fig. 1) is the characteristic large form of *C. foenea* with crowded spikes of large spikelets; the third (*C. albolutescens* of Olney) is, as represented by two sheets in the Gray Herbarium, a form between the large state and the small typical *C. foenea;* while the fourth component (*C. albolutescens*, var. *sparsiflora*, Olney — at least the New Brunswick plant) in habit as well as in the nerveless inner face of the perigynium closely matches the first cited plate (Boott's table 380). From the fact that var. *perplexa* was proposed as a variety of *C. foenea* it is probable that its author had in mind the coarse form represented by Boott's table 382, fig. 1, and in the present treatment of the group it has seemed advisable to retain that name for the large plant.

Olney's *Carex albolutescens*, var. *sparsiflora* is represented in the Olney Herbarium by two different plants. One of these, from Oregon, is the dark-spiked form of *C. praticola* which has been described as *C. pratensis*, var. *furva*, Bailey. The other, from Kent Co., New Brunswick, the northeastern plant which is identified with Boott's table 380, is much more closely related to *C. adusta*, Boott, than to *C. foenea*, Willd.

[1] Mem. Torr. Cl., I. 24.

From the former species it differs constantly in its more slender habit and flexuous elongated spikes of clavate-based spikelets, as well as in smaller achenes. It is a plant of broad range from Labrador to British Columbia, creeping south to the coast of New England and the mountains of New England and New York. Since its varietal name, *sparsiflora*, is preoccupied in the genus, another specific name is here proposed in reference to the characteristic color of the mature inflorescence.

The other large group of the *Hyparrhenae* which has been treated by recent authors as the subsection *Elongatae* contains plants of two markedly different tendencies. One group is characterized by strongly divergent thin-edged perigynia which are spongy at base. The other group has ascending plump or plano-convex perigynia which are rarely thin-edged and are without conspicuously spongy bases. Mr. Theodor Holm, who has recently studied some of the members of the first group, includes with them *Carex gynocrates* and *C. exilis*, which by most other authors have been placed in the *Dioicae*. The texture and aspect of the perigynia seem to justify the treatment proposed by Mr. Holm and formerly for *C. exilis* by Francis Boott;[1] and for the group thus constituted Mr. Holm suggests the name *Astrostachyae*.[2] The other group, with ascending blunt-edged perigynia, may well retain the subsectional name *Elongatae*, since the characteristic species, *C. elongata*, *C. brunnescens* (*C. Gebhardii*), *C. canescens* (*C. curta*), etc., were originally included in it by Kunth.

Mr. Holm, in the paper cited, takes exception[3] to Professor Bailey's recent treatment[4] of *Carex echinata*, *C. sterilis*, and *C. scirpoides*, on the ground that that author had been more controlled by the original specimens of Willdenow and of Schkuhr than by the original diagnoses. That Willdenow's original descriptions do not accord well with Professor Bailey's conclusions there can be no doubt; and when we are told by Professor Bailey that *C. sterilis* and *C. scirpoides* are identical, and when he says "the figures of both *C. sterilis* (fig. 146) and *C. scirpoides* (fig. 180) in Schkuhr's 'Riedgräser' are unequivocal,"[5] we find it indeed difficult to understand his observations. An examination of Schkuhr's figures shows his *C. sterilis* (fig. 146) to be a coarse plant with sharp-pointed ovate scales and broad-ovate cordate perigynia with distinct beak shorter than the body. Schkuhr's *C. scirpoides* (fig. 180), on the other hand, is represented with broad-oblong or elliptical blunt

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[1] Boott, Ill., I. 17.
[2] Holm, Theo., Am. Jour. Sci., Ser. 4, XI. 205-223.
[3] Holm, l. c., 212.
[4] Bailey, Bull. Torr. Cl., XX. 422.
[5] Bailey, l. c., 424.

scales and deltoid-ovate obscurely short-beaked perigynia. These figures of Schkuhr's agree very well with his descriptions. Furthermore, they agree equally well with Willdenow's diagnoses, for these latter were essentially the same as Schkuhr's. Professor Bailey further states that *C. sterilis* and *C. scirpoides* are identical with the common American plant which he had formerly treated as *C. echinata*, var. *microstachys*, a plant with lanceolate or narrowly ovate slender-beaked perigynia; and for this aggregate he takes up the name *C. sterilis*. After thus bunching three very different species as *C. sterilis*, he separates from "our so-called *Carex echinata*" two plants, *C. atlantica* and *C. interior*, with "ample specific characters."

Through the kindness of Dr. J. M. Greenman the writer has been able to examine camera-drawings of Willdenow's original material; while from Professor Carl Mez he has received fragments from the original material of Schkuhr. The drawings of the Willdenow material of both *Carex sterilis* and *C. scirpoides*, and the Schkuhr specimens of *C. scirpoides* agree with the original diagnoses. Dr. Greenman has, further, compared critically specimens sent him of the different American forms with Willdenow's plants and with authentic specimens of *C. stellulata*, Gooden. (*C. echinata*, Murray). The identification thus made of these forms, leads to a conclusion very different from that published by Professor Bailey. These results may best be stated by discussing separately the three clearly cut species which have been so unfortunately confused.

Carex echinata, Murray (*C. stellulata*, Gooden.). This species was long considered a boreal plant of broad range, and it was so treated by Torrey, Tuckerman, Dewey, Carey, and other early students of American *Carices*. Francis Boott distinctly implied that the European species occurs in British America, saying: "I have not seen specimens which I can satisfactorily refer to the European *C. stellulata*, south of the British provinces of North America."[1] Yet Professor Bailey has interpreted this to mean that "Francis Boott questioned if the American plant is the same as the European *C. stellulata* (or *C. echinata*);" and in "eliminating the European species from our flora," he says: "Definite specific characters of separation are obscure, and yet I am convinced that they exist. The American plant is habitually taller than the European, the scales are sharper and usually longer, the perigynia are more strongly nerved and more attenuated or conical,

[1] Boott, Ill., I. 56.

and above all, it is far more variable. . . . There are probably no species common to both countries, except those which are hyperboreal and occur through the Arctic regions of both hemispheres, being found in Greenland."[1]

Then Professor Bailey defines his conception of the "habitually taller" American plant with "sharper" scales, etc., etc., including in it forms varying from the low slender *Carex stellulata*, var. *angustata*, Carey, with "*narrowly-lanceolate perigynia* tapering into a long . . . beak,"[2] to the tall (often nearly 1 m. high) coarse *C. sterilis*, Willd., with broad-ovate perigynia, and the slender *C. scirpoides*, Schkuhr, with thick scarcely beaked often nerveless deltoid-ovate perigynia and elliptic blunt scales. The two latter constituents of this aggregate apparently do not occur outside North America and if they are included with the other American representative of *C. echinata* as one species, it is of course easily said that the American plant is taller or shorter, coarser or more slender than the European; and certainly a species so constituted is "far more variable."

When, however, we eliminate from the complex *Carex sterilis* of Professor Bailey's treatment the true *C. sterilis* and *C. scirpoides*, there is left a plant characterized by slender culms and leaves, the perigynia barely half as broad as long, and tapering to a slender conspicuous beak which is often nearly as long as the body. This is the *C. echinata* or *C. stellulata* of American authors and it includes as formal variations the very slender var. *angustata*, Carey (*C. echinata*, var. *microstachys*, Boeckeler), and the tall *C. sterilis*, var. *excelsior*, Bailey, while a very coarse variation with rather better defined characteristics is *C. echinata*, var. *cephalantha*, Bailey.

This American species with the narrow perigynia has been compared many times by the writer with European *C. echinata* in a vain attempt to find some point of distinction. Specimens collected by Godet at Lignières on the River Cher in central France are inseparable from Mertens' material from Sitka, and, again, Japanese specimens collected by Chas. Wright and by Maries are identical in their slender perigynia with Newfoundland plants. In order, however, to test still further the specific value of the American plant a portion of Allen's Labrador material was forwarded to Dr. Greenman at Berlin, and he was asked to compare it, along with other American forms, with Willdenow's types

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[1] Bailey, Bull. Torr. Cl., XX. 423.

[2] Carey in Gray, Man. 544.

and with other authentic European specimens of the group. In reply Dr. Greenman writes of this specimen:

"No. 4. Differs from the original *C. sterilis*, Willd., in the following characters: (*a*) narrower, more gradually acuminate and longer beaked perigynium; (*b*) more oblong achene, which is less narrowed at the base. To me, however, your No. 4 is a *perfect* match for *Carex stellulata* in herb. Willdenow, and for European *C. echinata*, Murr. I am quite unable to make any distinction between them. The perigynial characters are exactly the same."

Extreme difficulty is experienced, then, in attempting to distinguish the American *Carex echinata* from Old World material. The range of the American plant, too, from Labrador to Alaska, and southward in the mountains, immediately places the species in the hyperboreal flora from which Professor Bailey, at least by inference, would exclude it. In view of these two facts there seems, then, as Mr. Holm has already indicated, good reason to consider both the American and the European plant *C. echinata*, Murr.

Carex sterilis, Willd. This plant has already been sufficiently defined in the discussion of Willdenow's original description and of Schkuhr's figure. The writer has, however, examined with much care camera-drawings of Willdenow's material made by Dr. Greenman and fragments of Schkuhr's material generously sent by Professor Carl Meż. The Willdenow plant, which alone is of final importance, proves to be identical with the large species of the Atlantic seaboard recently described as *C. atlantica*. The fragment sent by Professor Mez from the Schkuhr herbarium is, however, from cultivated material, and is only a form of *C. echinata* with narrow perigynia quite unlike those shown in Schkuhr's figure and in the Willdenow plant as further shown by Dr. Greenman's report of his critical comparisons in the Willdenow herbarium.

Besides No. 4, the Labrador *Carex echinata*, two other forms were sent to Dr. Greenman for comparison with *C. sterilis*. No. 1 is *C. echinata*, var. *cephalantha*, Bailey, collected by Dr. C. B. Graves at Waterford, Connecticut, May 27, 1896. No. 2 is characteristic *C. atlantica*, Bailey, collected by Dr. G. G. Kennedy at Ponkapog, Canton, Massachusetts, July 12, 1899. Of these two plants Dr. Greenman writes:

"No. 1. This differs from *C. sterilis*, Willd., in the following characters: (*a*) longer inflorescence, more remote and slightly longer spikelets; (*b*) longer and more prominently beaked perigynium; (*c*) achene less narrowed at the base.

"No. 2. I am quite unable to distinguish this plant from the original of *C. sterilis*, Willd. It has the same broad-ovate, short-acuminate or short-beaked perigynium, and the same achenial characters, that is, the achene is rather conspicuously narrowed below. The characters of the inflorescence are the same, except as to color. The Willdenow plant is more brownish: this, however, may be due, at least to a certain extent, to age."

From Willdenow's original description, from Schkuhr's description and figure, and from Dr. Greenman's examination and drawings of the Willdenow plant, there seems no question, then, that *Carex atlantica*, Bailey, is the true *C. sterilis*, Willd.

Carex scirpoides, Schkuhr. The characters of this species, likewise, are sufficiently stated in the discussion of Schkuhr's and Willdenow's characterizations. Material from the Schkuhr herbarium received through Professor Mez is identical with camera-drawings made by Dr. Greenman from Willdenow's plant. These accurately agree, also, with Schkuhr's fig. 180. This species, was, furthermore, correctly interpreted by Sartwell, Carey, and Boott, and it is well represented as *C. stellulata*, var. *scirpoides* in Boott's Illustrations, t. 146.** Sartwell's No. 36 and Boott's plate are the only exact citations given by Professor Bailey for his *C. interior*, and his description of the so-called new species accords well with those of Willdenow and of Schkuhr. In distinguishing *C. interior* from *C. scirpoides*, Bailey says that the former has "greenish-tawny spikes," while the latter is "fulvous;" and he furthermore describes Schkuhr's *C. scirpoides*, "as the plate plainly shows," with "long-beaked broad-winged perigynia." How such a statement and such conclusions could have been made is very puzzling. There can be no question, however, that the figure of Schkuhr's *C. scirpoides* as interpreted by Dewey, Schweinitz, Torrey, Sartwell, Carey, Francis Boott, Holm, and other students of the genus, is the same as Boott's table 146** upon which, in part, *C. interior* was founded.

The name *Carex scirpoides*, Schkuhr, so long attached to this plant, was published in 1805, but it cannot, unfortunately, be retained for the species, since in 1803 Michaux published *C. scirpoidea*, the well known dioecious plant of extreme boreal and alpine regions. The next clearly defined name for the plant seems to be *C. interior*, although, as originally intended by its author, that name was supposed to apply to a species very distinct from *C. scirpoides*. Tuckerman, it is true, published in his Enumeratio Methodica the name *C. stellulata*, var. *scirpina*, citing *C. scirpoides*, Schkuhr, as a synonym. On a preceding page, however,

in an unfortunate endeavor to latinize one of Michaux's names, he had substituted *C. scirpina* for *C. scirpoidea*, Michx., not *C. scirpoides*, Schkuhr. This unfortunate citation of "C. scirpina" as a pure synonym of Michaux's *C. scirpoidea* attaches to that name a decided element of indefiniteness. It is, therefore, wiser to take for the plant of Schkuhr and of Willdenow the more clearly defined name, *C. interior*.

One other plant of the *Astrostachyae* has been the source of much confusion in the treatment of New England species of this group. Unlike *Carex echinata*, *C. sterilis*, and *C. interior*, the perigynia of this plant are broadest at the middle, thence tapering to a narrow base. In aspect the plant is strikingly like the largest form of *C. canescens*, but its thin-edged strongly recurved perigynia place it clearly in the *Astrostachyae*. The species is not uncommon from eastern Massachusetts to Delaware and central New York, and in New England herbaria it has recently passed variously as *C. atlantica*, *C. interior*, *C. canescens*, var. *vulgaris*, *C. sterilis*, var. *excelsior*, &c. From notes left by the late William Boott it is apparent that he recognized in some of Chas. Wright's Connecticut material an undescribed form, but evidently he never described the plant. A portion of the original material of the late Dr. Eliot C. Howe's *Carex seorsa*, generously furnished the writer by Professor C. H. Peck, agrees in every regard with the perplexing New England plant, and under that name the species should now be known.

The members of the *Elongatae*, as here interpreted, offer less difficulties than the other species of the *Hyparrhenae*, and special discussion is needed only of the forms which have been at various times associated with *Carex canescens*. These plants present two marked forms in their perigynia: in one plant, *C. arcta*, the perigynium is broadest at the rounded or subcordate base; while in *C. canescens* and *C. brunnescens* (*C. vitilis*, Fries) the perigynium is nearly elliptic in outline, being broadest near the middle.

Carex arcta of Francis Boott was originally published by him as *C. canescens*, var. *polystachya*, but in his latest treatment of the plant he considered it a distinct species. As stated, its perigynial character is very constant. Furthermore, its rather limited strictly American range and unique habit quickly separate it from most forms of *C. canescens*. *C. canescens*, var. *oregana*, Bailey, said to differ from var. *polystachya* in having the "head larger and more dense . . . becoming brownish," has identical perigynia with that plant, and the spikes (heads) are green or brownish, as are those of the eastern plant, a character dependent on age and exposure to light.

Carex canescens, L., is characterized by its glaucous color and strongly appressed-ascending elliptic pointed perigynia tapering very gradually to the short beak. Another plant, *C. brunnescens*, Poir. (*C. canescens*, var. *alpicola*, Wahl., *C. canescens*, var. *vulgaris*, Bailey), is usually bright green, and the few loosely spreading-ascending perigynia are rather abruptly contracted to a definite serrulate-based beak. This plant is common in dry soils throughout the boreal sections of America and Europe; while the glaucous *C. canescens* is a species of very wet situations. Under various names, *C. vitilis*, Fries, *C. Gebhardii*, Hoppe, etc., *C. brunnescens* has been treated as a species, and as often again as a variety of *C. canescens*. An examination of much material shows its characters to be essentially constant, and, though the plant superficially resembles small forms of *C. canescens*, its claim to specific rank rests upon a number of definite characters.

When *Carex arcta* and *C. brunnescens* are removed from *C. canescens*, there remains a species characterized by its glaucous foliage and appressed scarcely beaked perigynia. This species presents in America three noteworthy variations. The true *C. canescens*, L., of northern Europe has the spikes 2.5 to 5 cm. long, of 4 to 7 oblong-cylindric to narrowly obovoid spikelets 0.6 to 1 cm. long. This plant occurs in Arctic America coming south to northern New England and New York, the Rocky Mts., and Vancouver. Rare in the eastern United States and Canada, the typical form of *C. canescens* has been misinterpreted by recent American students, although the species was very clearly discussed by Francis Boott. The American plant which has passed as true *C. canescens* is, however, strikingly different in aspect, and consequently the typical plant has more than once been published as a local American variety — var. *dubia*, Bailey, and var. *robustina*, Macoun.

Another form of *Carex canescens* common to northern Europe and America is var. *subloliacea*, Laestadius. In this plant the spike is usually rather shorter than in typical *C. canescens*, the less approximate globose or short-oblong few-flowered spikelets are only 4 to 7 mm. long, and the smaller perigynium is nearly or quite smooth. In its smooth perigynium this plant approaches *C. heleonastes*, which, however, has larger spikelets and perigynia and quite lacks the distinctive glaucous aspect of *C. canescens*. The var. *subloliacea*, which is commoner in northern New England than is the true *C. canescens*, also simulates *C. brunnescens*; but it is very canescent and the perigynia otherwise as in true *C. canescens* are essentially smooth, while in the greener *C.*

brunnescens they are distinctly beaked, of more membranous texture, and usually with serrate margins.

The commonest form of *Carex canescens* in North America is the plant mentioned without name by Francis Boott and figured by him in his Illustrations, IV. table 496. This unique American form, which in essential characters is like true *C. canescens*, differs in its elongated inflorescence, 5 to 15 dm. long, at least the lower spikelets very remote. The plant seems to have been generally treated by American authors as typical *C. canescens*, and no published name is available for it.

The following synopsis presents the characters and ranges of the northeastern *Hyparrhenae* as now understood by the writer. In its preparation he has studied the material in the Gray Herbarium and the herbarium of the New England Botanical Club; as well as the hundreds of sheets in the herbarium of the Geological Survey Department of Canada, kindly placed at his disposal by Mr. James M. Macoun; those of the Olney Herbarium of Brown University, made accessible to him by Mr. J. Franklin Collins; and a series from the Fairbanks Museum at St. Johnsbury, Vermont, rich in forms of the *scoparia* group, specially accumulated by the director, Dr. T. E. Hazen, for detailed study, and then generously forwarded to the writer. He has also been greatly assisted by the use of material from the private herbaria of the Honorable J. R. Churchill; President Ezra Brainerd; Doctors C. B. Graves, J. V. Haberer, G. G. Kennedy, and C. W. Swan; and Messrs. Luman Andrews, C. H. Bissell, Walter Deane, E. L. Rand, W. P. Rich, and E. F. Williams. The identification of dubious species of Willdenow and of Schkuhr has been facilitated by the coöperation of Dr. J. M. Greenman while at the Royal Botanical Museum in Berlin, and by Prof. Carl Mez of the University of Halle; and authentic material of the late Dr. E. C. Howe's *Carex seorsa* has been generously furnished by Prof. C. H. Peck.

HYPARRHENAE, Fries. Staminate flowers scattered or at the base of the uniform spikelets (only in exceptional individuals and in the often dioecious *C. gynocrates* and *C. exilis* the entire spikelet staminate).

Key to Species.[1]

* Perigynia with thin or winged margins.

+ Perigynia ascending, the tips only sometimes wide-spreading or recurved, not spongy at base, the margins winged at least toward the beak.

[1] The perigynial characters are here based on study of mature plants. In general the perigynia at the tip of the spikelet are less characteristic than those nearer the middle; and, if possible, the latter alone should be used in critical comparisons.

++ Bracts wanting or setaceous, if broad at most twice as long as the spike.

= Plant strongly stoloniferous; culms rising from an elongated root-stock: perigynium firm, 5 to 6 mm. long . . . . . (4) *C. siccata.*

= = Plant not strongly stoloniferous; culms solitary or in stools.

a. Perigynia less than 2 mm. broad.

1. Perigynia 5 mm. or more long.

○ Perigynia 7 to 10 mm. long: spikelets oblong-cylindric, pointed, 1.5 to 2.5 cm. long . . . . . (1) *C. muskingumensis.*

○ ○ Perigynia shorter (or, when exceptionally 7 mm. long, in shorter spikelets).

\+ Perigynia half as broad as long, plump, nerveless or obscurely short-nerved on the inner face . . . . . (21) *C. aenea.*

\+ + Perigynia one-third as broad as long.

× Perigynia thin and scale-like, scarcely distended over the achenes, distinctly nerved on the inner face, and prominently exceeding the subtending scales.

§ Leaves at most 3 mm. wide: spikelets 3 to 9, glossy brown or straw-colored, pointed.

Spike oblong-ovoid or subcylindric, with ascending approximate spikelets . . . . . (2) *C. scoparia.*

Spike moniliform . . (2) *C. scoparia*, var. *moniliformis.*

Spike short-globose or broad-ovoid, the spikelets crowded and divergent . (2) *C. scoparia*, var. *condensa.*

§ § Leaves more than 3 mm. wide: spikelets 8 to 14, green or dull brown, blunt . . . . . (3) *C. tribuloides.*

(For vars. see below.)

× × Perigynia firm, obviously distended over the achenes, nerveless or obscurely nerved on the inner faces, equalled by the subtending scales . . . . (7) *C. praticola.*

2. Perigynia less than 5 mm. long.

○ Perigynia thin and scale-like, scarcely distended over the achenes: leaves 3 to 8 mm. broad.

\+ Perigynia with appressed tips.

Spike oblong, the spikelets approximate . (3) *C. tribuloides.*

Spike moniliform, the spikelets scattered (3) *C. tribuloides*, var. *turbata.*

\+ + Perigynia with spreading tips: spike flexuous (3) *C. tribuloides*, var. *reducta.*

○ ○ Perigynia firm, obviously distended over the achenes.

\+ Perigynia elongate-lanceolate or subulate, less than one-third as broad as long, at most 1.4 mm. broad.

× Tips of perigynia conspicuously exceeding the lance-subulate dull scales.

Culms 1 to 4 dm. high: leaves 1 to 2.5 mm. wide: spikelets 3 to 7 mm. long . . . . . (5) *C. Crawfordii.*

Culms taller: leaves broader: spikelets 8 to 11 mm. long
(5) *C. Crawfordii*, var. *vigens*.

× × Tips of perigynia equalled by the ovate bluntish glossy dark scales . . . . . (6) *C. oronensis*.

+ + Perigynia broader, nearly or quite half as broad as long.

× Tips of perigynia distinctly exceeding the subtending scales.

§ Leaves 2.5 mm. or more wide.

□ Spikelets compactly flowered, the mature perigynia with recurved or spreading tips concealing the scales . . . . . (8) *C. cristata*.

□ □ Spikelets with ascending or slightly spreading perigynia; scales apparent.

△ Mature perigynia greenish or pale straw-colored, in loose spikelets: spikes more than 2.2 cm. long (if shorter, with dark chestnut scales).

Spikelets approximate in ovoid or oblong spikes.

Scales pale, not strongly contrasting with the perigynia . . . . . (10) *C. mirabilis*.

Scales dark chestnut, strongly contrasting with the perigynia . . (10) *C. mirabilis*, var. *tincta*.

Spikelets scattered in a moniliform spike
(10) *C. mirabilis*, var. *perlonga*.

△ △ Mature perigynia brown, in dense spikelets: spikes at most 2.2 cm. long: scales pale brown
(17) *C. Bebbii*.

§ § Leaves narrower.

Spike stiff, with crowded closely flowered spikelets
(17) *C. Bebbii*.

Spike flexuous and moniliform, or at least with the loosely flowered spikelets scattered . (11) *C. straminea*.

× × Tips of perigynia equalled by the subtending scales.

§ Spike stiff and erect, or at least with the spikelets approximate.

Spike brown or ferrugineous . . . . (19) *C. leporina*.

Spike brownish white . . . . . (20) *C. xerantica*.

§ § Spike flexuous, or at least with the lower spikelets remote.

□ Perigynia nerveless or minutely short-nerved on the inner face.

Mature perigynia straw-colored or pale brown, one-third as broad as long . . . . . (7) *C. praticola*.

Mature perigynia olive-green or bronze, one-half as broad as long . . . . . (21) *C. aenea*.

□ □ Perigynia with strong ribs the length of the inner face: spike silvery green . . . . . (18) *C. foenea*.

b. Perigynia 2 mm. or more broad.

1. Tips of the perigynia distinctly exceeding the subtending scales.

○ Perigynia thin and scale-like, barely distended over the achenes, one-fourth to one-third as broad as long.
Perigynia 7 to 10 mm. long . . . . . (1) *C. muskingumensis.*
Perigynia shorter . . . . . (2) *C. scoparia.*
(For vars. see above.)

○ ○ Perigynia firmer, obviously distended over the achenes, nearly or quite half as broad as long.

\+ Perigynia lance-ovate, about half as broad as long.

× Leaves 2.5 mm. broad, or broader . . . . (10) *C. mirabilis.*
(For vars. see above.)

× × Leaves narrower.

§ Perigynia distinctly about 10-nerved on the inner faces, 4 to 6 mm. long.
Spikelets 8 to 12 mm. long: perigynia 4.8 to 6 mm. long . . . . . (12) *C. tenera.*
Spikelets 5 to 8 mm. long: perigynia 4 to 5 mm. long (12) *C. tenera*, var. *invisa.*

§ § Perigynia 3- to 5-nerved on the inner faces, mostly less than 4 mm. long.
Perigynia with ascending inconspicuous tips (11) *C. straminea.*
Perigynia with divergent conspicuous tips (11) *C. straminea*, var. *echinodes.*

\+ + Perigynia with broad-ovate to orbicular bodies.

× Spike moniliform and flexuous, with mostly clavate-based spikelets.
Spikelets brownish-white; of close-appressed obscurely beaked firm perigynia . . . . . (14) *C. silicea.*
Spikelets ferrugineous; the abrupt slender beaks of the perigynia with conspicuous loosely ascending or spreading tips . . . . . (12) *C. tenera*, var. *Richii.*

× × Spike stiff (or, if flexuous, with brown or ferrugineous spikelets).

§ Perigynia 5.6 to 7.7 mm. long, very thin, scale-like, almost transparent: scales blunt . . . (13) *C. Bicknellii.*

§ § Perigynia less than 5.6 mm. long, firm and opaque (when exceptionally longer in *C. alata*, with aristate scales).

□ Scales long-acuminate or aristate: perigynia 4 to 5.5 mm. long: achenes oblong.

△ Spike green, or finally dull brown: scales lance-subulate: perigynia obovate, 2.8 to 3.7 mm. broad, abruptly narrowed at base . . . . (15) *C. alata.*

△ △ Spike dark brown or ferrugineous: perigynia 2.3 to 2.8 mm. broad.
Spikelets closely approximate: scales ovate-lanceolate: perigynia ovate, tapering gradually to the beak . . . . (15) *C. alata*, var. *ferruginea.*

Spikelets scattered in a flexuous spike: scales lanceolate: perigynia orbicular, abruptly slender-beaked . . . . . (12) *C. tenera*, var. *Richii*.

□ □ Scales blunt or at most acutish.

Spikelets gray-green or finally dull brown, with strongly appressed-ascending very firm perigynia 3.5 to 4 (very rarely 4.5) mm. long (9) *C. albolutescens*.

Spikelets straw-colored or ferrugineous, with spreading-ascending perigynia 4 to 5.5 mm. long.

Spike of 5 to 10 mostly distinct spikelets (16) *C. festucacea*.

Spike of 3 to 6 approximate spikelets (16) *C. festucacea*, var. *brevior*.

2. Tips of perigynia equalled by the subtending scales.

○ Spike stiff and erect, or at least with approximate spikelets.

\+ Spike whitish or gray-green.

× Perigynia lance-ovate, 4 to 4.8 mm. long, nerveless on the inner faces, golden-yellow at base . . (20) *C. xerantica*.

× × Perigynia broad-ovate to suborbicular.

Perigynia strongly ribbed the length of the inner faces, 2 mm. broad . . . . . (18) *C. foenea*.

Perigynia nerveless or faintly nerved on the inner faces, broader . . . . . (9) *C. albolutescens*.

\+ + Spike bronze or ferrugineous.

Perigynia distinctly concave on the usually nerved inner faces: achene 1 mm. broad . . . . . (19) *C. leporina*.

Perigynia flat or convex on the usually nerveless inner faces, very plump: achene 2 mm. broad . (22) *C. adusta*.

○ ○ Spike flexuous, at least the lowest spikelets remote.

\+ Perigynia nerveless or only faintly short-nerved on the inner faces.

Perigynia ovate-lanceolate, one-third as broad as long: achene 1 mm. broad . . . . . (7) *C. praticola*.

Perigynia ovate, half as broad as long: achene 1.5 mm. broad . . . . . (21) *C. aenea*.

\+ + Perigynia distinctly nerved on the inner faces.

× Perigynia 2.8 to 4.4 mm. long, at most 2.4 mm. broad, 7- to 13-ribbed on the inner faces, abruptly beaked.

Spike of 4 to 9 spikelets 6 to 10 mm. long: perigynia 2.8 to 4 mm. long . . . . . (18) *C. foenea*.

Spike of 6 to 15 spikelets 10 to 17 mm. long: perigynia 3.5 to 4.4 mm. long . . . (18) *C. foenea*, var. *perplexa*.

× × Perigynia 4 to 5.3 mm. long, 2.5 to 3 mm. broad, 3- to 5-nerved on the inner faces, obscurely broad-beaked (14) *C. silicea*.

↔ ↔ Bracts leaf-like and much prolonged, the lowest 1 to 2 dm. long: spikelets crowded: perigynia subulate . . . . (23) *C. sychnocephala*.

+– +– Perigynia horizontally spreading or reflexed when mature, spongy at base, with thin but scarcely winged margins.

++ Spikelets solitary and terminal, pistillate or staminate, or with the flowers variously scattered.

Stoloniferous; the filiform culms at most 3 dm. high, from filiform rootstocks . . . . . (24) *C. gynocrates.*

Not stoloniferous; the wiry culms 2 to 7 dm. high, in caespitose stools (25) *C. exilis.*

++ ++ Spikelets 2 to several.

= Perigynia broadest at base: beak rough or serrulate.

a. Perigynia at most half as broad as long, finally yellowish, with slender beak nearly equalling the body: scales pointed.

1. Perigynia ovate, 3 or 4 mm. long.

○ Spikelets at most 12-flowered.

Spike 1 to 3 cm. long, the 2 to 6 spikelets subapproximate (26) *C. echinata.*

Spike 2 to 6 cm. long, the 2 to 4 spikelets very remote, the terminal with a clavate base 0.5 to 1 cm. long (26) *C. echinata*, var. *ormantha.*

○ ○ Spikelets with more flowers.

Leaves 1 to 2.5 mm. broad: spikelets scattered, 12- to 20-flowered: perigynia less than half as broad as long (26) *C. echinata*, var. *excelsior.*

Leaves 2 to 4 mm. broad: spikelets mostly approximate, 15- to 40-flowered; perigynia half as broad as long (26) *C. echinata*, var. *cephalantha.*

2. Perigynia lanceolate or ovate-lanceolate, 2.5 to 3 mm. long: spike of 2 to 6 approximate spikelets (26) *C. echinata*, var. *angustata.*

b. Perigynia more than half as broad as long, firm, brownish or dark green, the beak one-fourth to one-half as long as the body.

1. Scales sharp-pointed: leaves 2.5 to 4.5 mm. broad: spike 1.5 to 3.5 cm. long; spikelets 15- to 50-flowered: coarse plant (27) *C. sterilis.*

2. Scales blunt: leaves narrower: spike 1 to 2 cm. long; spikelets 5- to 15-flowered: slender plants.

Leaves 1 to 2 mm. broad: perigynia faintly nerved or nerveless on the inner faces . . . . . (28) *C. interior.*

Leaves narrower: perigynia strongly nerved (28) *C. interior*, var. *capillacea.*

= = Perigynia broadest near the middle, less than 2 mm. broad, very thin and conspicuously nerved, with short smooth beak: spikelets remote . . . . . (29) *C. seorsa.*

* * Perigynia not thin-winged, ascending from the first, plano-convex.

+– Perigynia 4 mm. or more long, long-beaked.

Spikelets lanceolate, in a loosely linear-cylindric spike: perigynia 1 to 1.3 mm. broad, strongly nerved: scales oblong: leaves 1 to 2.5 mm. broad . . . . . (33) *C. bromoides.*

Spikelets ovate, in flexuous spikes, the lowest very remote: perigynia 1.6 to 1.9 mm. broad, faintly nerved or nerveless: scales ovate: leaves 2 to 5 mm. broad . . . . . (34) *C. Deweyana.*

+ + Perigynia less than 4 mm. long.

++ Perigynia 2 mm. or more long.

= Perigynia with serrulate beaks or margins.

a. Spike elongate, from linear-cylindric to oblong.

1. Perigynia ovate, broadest at base: spikelets mostly or all approximate in an oblong-cylindric spike . . . (30) *C. arcta.*

2. Perigynia broadest near the middle.

○ Plant glaucous: leaves 2 to 4 mm. broad: spikelets with many appressed-ascending glaucous obscurely beaked perigynia. Spikelets 6 to 10 mm. long, approximate, or the lowest rarely 1.5 cm. apart: perigynia 2.3 to 3 mm. long . (31) *C. canescens.*

Spikelets 4 to 7 mm. long, subapproximate or remote: perigynia about 2 mm. long (31) *C. canescens*, var. *subloliacea.*

Spikelets 6 to 12 mm. long, remote, the lowest 2 to 4 cm. apart . . . . . (31) *C. canescens*, var. *disjuncta.*

○ ○ Plant green, not glaucous: leaves 1 to 2.5 mm. broad: spikelets with few loosely spreading dark green or brown distinctly beaked perigynia . . . . . (32) *C. brunnescens.*

b. Spike subglobose, of 2 to 4 closely approximate subglobose loosely flowered silvery spikelets: perigynia oblong, beakless, nerved, 3 to 3.4 mm. long . . . . . (35) *C. tenuiflora.*

= = Perigynia smooth throughout.

a. Spike whitish, silvery-green or pale brown, not ferrugineous nor dark brown.

1. Spike elongate, at least the lower spikelets scattered.

Uppermost spikelet divaricate-pedunculate, the lowermost subtended by a long leaf-like bract: perigynia more than 3 mm. long . . . . . (36) *C. trisperma.*

Spikelets continuous in a linear-cylindric loose spike, bractless or only short-bracted: perigynia 2 to 3 mm. long (31) *C. canescens.*

(For vars. see above.)

2. Spike subglobose, of 2 to 4 closely approximate subglobose loosely flowered spikelets: perigynia beakless, 3 mm. or more long . . . . . (35) *C. tenuiflora.*

b. Spike ferrugineous or dark brown.

1. Terminal spikelet with conspicuous clavate base: perigynia abruptly beaked: culms smooth (or harsh only at tips).

○ Spikelets distinct; the lowest 4 or 5 mm. thick; the terminal 1 to 1.8 cm. long: perigynia pale, about equalled by the yellowish-brown blunt scales . . . . . (38) *C. norvegica.*

○ ○ Spikelets approximate; the lowest less than 4 mm. thick.

Plant weak and lax: leaves involute, 0.5 to 1.5 mm. broad: perigynia pale, equalled by the ferrugineous acutish scales (39) *C. glareosa.*

Plant stiff and upright: leaves flat, 1 to 3 mm. broad: perigynia brown or reddish, exceeding the fuscous obtuse scales . . . . . (40) *C. lagopina.*

2. Terminal spikelet without conspicuous clavate base: perigynia obscurely beaked, brown-tinged, exceeding the blunt scales: culms sharply angled, harsh and stiff: leaves flat, erect (41) *C. heleonastes.*

++ ++ Perigynia at most 1.5 mm. long, oblong-cylindric, plump, nerveless, beakless or with a very short broad truncate beak: culms wiry: spike linear-cylindric, dull brown . . . . . (37) *C. elachycarpa.*

SYNOPSIS OF SPECIES.

Ovales, Kunth. *Perigynia ascending* or slightly spreading (when horizontally spreading, always with winged margins), *with thin or winged margins*, mostly *with concave inner faces* when mature.

§ Ovales proper. Bracts, when present, setaceous, or, if broader, only once to twice longer than the spike.

* Mature perigynia one-fourth to one-third (.24 to .36) as broad as long.

+ Perigynia extremely thin and scale-like, barely distended over the achenes.

++ Perigynia 7 to 10 (average 8.3) mm. long.

1. C. muskingumensis, Schweinitz. — Figs. 1, 2. — Culms 1 m. or less tall, very leafy: the loose flat *leaves subcordate* at their junction with the loose green sheaths; those of the sterile shoots crowded and almost distichous: spike oblong, of 5 to 12 appressed-ascending *oblong-cylindric pointed spikelets 1.5 to 2.5 cm. long.* — Ann. Lyc. N. Y. i. 66; Dewey, Am. Jour. Sci. x. 281; Bailey in Gray, Man. ed. 6, 620; Britton in Britton & Brown, Ill. Fl. i. 355, fig. 861. *C. arida*, Schwein. and Torr. Ann. Lyc. N. Y. i. 312, t. xxiv. fig. 2; Carey in Gray, Man. 545; Boott, Ill. i. 20, t. 54; Boeckeler, Linnaea, xxxix. 112; Bailey, Proc. Am. Acad. xxii. 147; Macoun, Cat. Can. Pl. ii. 129. *C. scoparia*, Torr. Ann. Lyc. N. Y. iii. 394, in part, not Schkuhr. *C. scoparia*, var. *muskingumensis*, Tuck. Enum. Meth. 8, 17. — Meadows, swamps, and wet woods, Ohio to Manitoba and Missouri. July, August.

++ ++ Perigynia at most 6.5 (very rarely 7) mm. long.

= Perigynia 5 to 6.5 (average 5.7) mm. long.

2. C. scoparia, Schkuhr. — Figs. 3, 4. — Culms 0.2 to 1 m. high, mostly slender and erect: *leaves narrow* (*at most 3 mm. wide*), shorter than the culm: *spike* oblong-ovoid to subcylindric, *of 3 to 9 straw-colored or brownish mostly shining and ascending* ovoid *pointed spikelets* 0.5 to 1.5 cm. long. — Schkuhr in Willd. Sp. iv. 230, & Riedgr.

Nachtr. 20, t. Xxx. fig. 175; Dewey, l. c. viii. 94; Schwein. & Torr. l. c. 313; Torr. l. c.; Carey, l. c.; Boott, l. c. iii. 116, t. 368, in part; Bailey, l. c. 148, & in Gray, l. c.; Macoun, l. c. 131; Britton, l. c. 356, fig. 863; Howe, 48 Rep. N. Y. Mus. Nat. Hist. 42. *C. leporina*, Mich. Fl. ii. 170, not L. *C. lagopodioides*, var. *scoparia*, Boeckeler, l. c. 114. — Low grounds or even dry open woods, NEWFOUNDLAND to SASKATCHEWAN and OREGON, and southward. May–August.

Var. MONILIFORMIS, Tuck. Spikelets scattered in a slender *moniliform spike*, the lowest usually remote. — Enum. Meth. 8, 17; Boott, Ill. l. c. t. 368, in part. *C. tribuloides*, var. *reducta*, Bailey, Proc. Am. Acad. xxii. 147, as to syn., in part. *C. tribuloides*, var. *moniliformis*, Britton, l. c. as to syn., in part. — Range of species, but infrequent.

Var. **condensa**. — Fig. 5. — *Spikelets spreading, crowded* in a short globose or broad-ovoid head. — NEW HAMPSHIRE, Randolph, July 23, 1897 (*E. F. Williams*): VERMONT, Westmore, July 26, 1894 (*E. F. Williams*); Rutland, July 14, 1899 (*W. W. Eggleston*): MASSACHUSETTS, Tewksbury, July 21, 1858, Medford, July 26, 1865, Mystic Pond, Aug. 9, 1868, and July 20, 1873 (*Wm. Boott*): RHODE ISLAND, Providence, July 19, 1871 (*S. T. Olney*): CONNECTICUTT, Griswold, June 16, 1899 (*C. B. Graves*, no. 150): NEW YORK, Jefferson Co. (*Crawe*); Fulton Chain Lakes, August, 1895 (*J. V. Haberer*): ONTARIO, Courtland, June 26, 1901 (*John Macoun*, Herb. Geol. Surv. Can., no. 26,631).

= = **Perigynia 3.7 to barely 5 (average 4.5) mm. long.**

3. C. TRIBULOIDES, Wahlenb. — Figs. 6, 7. — Culms loose and usually tall, 0.3 to 1 m. high, sharply trigonous: *leaves soft and loose, 3 to 8 mm. broad*, numerous; the upper often nearly or quite overtopping the culm; *those of the sterile shoots crowded and somewhat distichous: spike* oblong, *of 8 to 14 obovoid ascending more or less crowded gray-green or dull brown spikelets* 7 to 12 mm. long: *perigynia with appressed tips.* — Köngl. Acad. Handl. xxiv. 145, and Fl. Lapp. 250; Bailey, Proc. Am. Acad. l. c., in Gray, l. c., & Mem. Torr. Cl. i. 54; Macoun, l. c. 130; Britton, l. c. fig. 862; Howe, l. c. 41. *C. lagopodioides*, Schkuhr in Willd. l. c., & Riedgr. Nachtr. 20, t. Yyy, fig. 177; Dewey, l. c. 95; Schwein. & Torr. l. c.; Carey, l. c.; Boott, Ill. l. c. t. 370; Boeckeler, l. c. 113. *C. scoparia* var. *lagopodioides*, Torr. Ann. Lyc. N. Y. iii. 394; Tuck. ll. cc. — Swales and rich open woods, particularly in alluvial soil, NEW BRUNSWICK to SASKATCHEWAN, and southward. June–Sept.

Var. TURBATA, Bailey. Spikelets remote, forming a *moniliform spike.* — Mem. Torr. Cl. i. 55, & in Gray, Man, l. c. — *C. lagopodioides*, var. Boott, l. c. 117, t. 371, fig. 1. — Range of species.

Var. REDUCTA, Bailey. — Fig. 8. — *Spike* usually *flexuous*, at least the *lowest spikelets scattered: perigynia with loosely spreading or recurved tips.* — Proc. Am. Acad. l. c., Mem. Torr. Cl. i. 56, & in Gray, l. c.; Macoun, l. c.; Howe, l. c. 42. *C. cristata*, Kunze, Car. t. 44, fig. *g*; Boott, l. c. 117, in part, t. 373; not Schwein. *C. lagopodioides*, var. *moniliformis*, Olney, Exsicc. fasc. ii. no. 8; Bailey, Bot. Gaz. x. 380. *C. tribuloides*, var. *moniliformis*, Britton, l. c., not *C. scoparia*, var. *moniliformis*, Tuck. — GULF OF ST. LAWRENCE to NOVA SCOTIA, NEW ENGLAND, NEW YORK, IOWA, and western ONTARIO; ascending in the White Mts. to 1,385 m. altitude.

+ + Perigynia firm, not scale-like, obviously distended over the achenes.

++ Plant strongly stoloniferous; culms rising from an elongated rootstock.

4. C. SICCATA, Dewey. — Figs. 9 to 11. — Culms slender, 1 to 6 dm. high; *leaves stiff, 1 to 3 mm. wide: spike of 3 to 7* approximate or scattered, *glossy brown spikelets*, the *staminate and pistillate flowers variously mixed or in distinct spikelets:* perigynia 5 or 6 mm. long, 2 mm. broad, usually with distinct serrulate wings. — Am. Jour. Sci. x. 278, t. F. fig. 18; Hook. Fl. Bor.-Am. ii. 212; Torr. l. c. 391; Carey, l. c. 539; Boott, Ill. i. 19, t. 52; Boeckeler, l. c. 134; Bailey, Proc. Am. Acad. l. c. 147, & in Gray, l. c. 619; Macoun, l. c. 114; Britton, l. c. 355, fig. 860; Howe, l. c. 47; Meinsh. Acta Hort. Petrop. xviii. 319. *C. pallida*, C. A. Meyer, Mém. Acad. St. Petersb. i. 215, t. 8. *C. Liddoni*, Carey, l. c. 545, not Boott. — Dry or sandy soil, VERMONT to BRITISH COLUMBIA and ALASKA, south to MASSACHUSETTS, CONNECTICUT, NEW YORK, OHIO, MICHIGAN and westward. May–July.

++ ++ Plant not strongly stoloniferous, culms solitary or in dense stools.

= Perigynia at most 1.4 mm. wide, elongate-lanceolate or subulate, 3.5 to 4 (rarely 4.5) mm. long.

a. Tips of perigynia conspicuously exceeding the lance-subulate scales: plant comparatively low, in dense stools.

5. C. Crawfordii. — Figs. 12, 13. — Very *slender, 1 to 3 dm. high;* the narrow (1 to 2.5 mm. wide) leaves ascending, often equalling or exceeding the culms: *spike dull brown*, oblong or ovoid, *often subtended by an elongate-filiform bract;* the 3 to 12 oblong or narrowly ovoid

ascending *spikelets 3 to 7 mm. long, approximate:* the linear-lanceolate perigynia plump at base, about 1 mm. wide. — *C. scoparia,* var. *minor,* Boott, Ill. iii. 116, t. 369; Gray, Man. ed. 5, 579; Bailey in Gray, Man. ed. 6, 621; Howe, l. c. 43. — Dry or rocky soil, or open woods. NEWFOUNDLAND, Whitbourne, Aug. 15, 1894 (*Robinson & Schrenk,* no. 94): PRINCE EDWARD ISLAND, Tignish, July 20, 1888 (*J. Macoun,* Herb. Geol. Surv. Can. no. 30,382): NEW BRUNSWICK, Nepisiquit Lakes, July, 1884 (*J. Brittain,* Herb. Geol. Surv. Canada, no. 30,377): QUEBEC, Rivière du Loup, Aug. 2, 1896, Lake Edward, Aug. 21, 1896, Tadousac, Aug. 26, 1896 (*Ezra Brainerd*); Roberval, July 27, 1892 (*G. G. Kennedy*): MANITOBA, Lake Winnipeg, July 29, 1884 (*John Macoun,* Herb. Geol. Surv. Can., no. 30,307, in part): ASSINIBOIA, Cypress Hills, June 25, 1894 (*J. Macoun,* Herb. Geol. Surv. Can., no. 7,461): SASKATCHEWAN, Carleton House and Bear Lake (*Sir John Richardson*): ATHABASCA (*Sir John Richardson,* Herb. Geol. Surv. Can. no. 30, 396): MAINE, Van Buren, July 25, 1893 (*M. L. Fernald,* no. 163); St. Francis, Aug. 7, 1893, Farmington, July 8, 1896 (*M. L. Fernald*); Beech Mt., Mount Desert Island, Aug. 20, 1890, Somesville, July 5, 1891, Southwest Harbor, Aug. 1, 1892, Little Cranberry Isle, July 10, 1894, Seal Harbor, July 5, 1897 (*E. L. Rand*); Gilead, Aug., 1897 (*Kate Furbish*): NEW HAMPSHIRE, Randolph, July 23, 1897 (*E. F. Williams*); near Crawfords, July 6, 1878, Mt. Washington, July 29, 1887, Franconia, July 6, 1878 (*E. & C. E. Faxon*); Crawford Notch, Aug. 24, 1891, Aug. 13, 1897, and Lebanon, July 22, 1890 (*G. G. Kennedy*): VERMONT, Mt. Mansfield, July 24, 1884 (*C. W. Swan*), Sept. 9, 1897 (*E. Brainerd*); Willoughby, July 21, 1896 (*G. G. Kennedy*); Middlebury, July 11, 1896, Ripton, July 19, 1898 (*E. Brainerd*); Rutland, July 1, 1899 (*W. W. Eggleston*): MASSACHUSETTS, Malden and Revere, June 21, 1879 (*H. A. Young*); Chelsea, July 19, 1891 (*W. P. Rich*): MICHIGAN, Houghton, Sept. 15, 1871 (*H. Gillman*); Keweenaw Co., Sept., 1888 (*O. A. Farwell*).

Var. **vigens.** — Fig. 14. — Stouter throughout: culms 3 to 6 dm. high: *leaves 2.5 to 3 mm. broad: spikelets mostly greener, 8 to 11 mm. long, densely crowded* in a broad-ovoid to globose head. — Thickets and damp gravelly soil. NEW BRUNSWICK, Campbellton, July 20, 1880 (*R. Chalmers,* Herb. Geol. Surv. Can. no. 30,363): QUEBEC, Gaspé, Aug. 1, 1882 (*John Macoun*); Rivière du Loup, July 20 and Aug. 4, 1896, Lake Edward, Aug. 21, 1896 (*Ezra Brainerd*): ONTARIO, Eastmans Springs, Sept. 16, 1892 (*J. Macoun,* Herb. Geol. Surv. Can. no. 30, 386); Cache Lake, July 11, 1900 (*John Macoun*): SASKATCHEWAN,

plains, Aug. 1, 1872 (*J. Macoun*): British Columbia, Nelson, Kootenay Lake, July 3, 1890 (*J. Macoun*, Herb. Geol. Surv. Can., no. 30, 393): Maine, St. Francis, Aug. 9, 1893, Sherman, Aug. 23, 1897 (*M. L. Fernald*): New Hampshire, Randolph, Aug. 2, 1897 (*E. F. Williams*); Mt. Washington, July 28, 1861 (*Wm. Boott*); Mt. Pleasant House, July 31, 1897 (*W. Deane*): Vermont, Burlington, July 13, 1896 (*E. Brainerd*): Michigan, Keweenaw Co., Aug., 1890 (*O. A. Farwell*).

b. Tips of perigynia mostly equalled by the ovate blunt or acutish scales: plant tall, forming loose stools.

6. C. oronensis. — Figs. 15, 16. — Culms *tall* and erect, 0.5 to 1 m. high, sharply angled and harsh above: leaves smooth, 2.5 to 4 mm. broad, much shorter than the culms: *spike oblong-cylindric*, *erect*, of 3 to 9 ascending *dark brown rhomboid-ovoid pointed spikelets* 0.5 to 1 cm. long: *scales* mostly *glossy brown, with pale scarious margins: perigynia appressed, about 4 mm. long, 1.3 mm. broad*, very narrowly winged above. — Dry fields, thickets, open woods, and gravelly banks. Maine, Orono, about 1870 (*F. Lamson-Scribner*), June 28, 1890, June 30, 1891, July 3, 1897 (M. L. Fernald).

= = Perigynia 1.5 to to 2 mm. broad, ovate-lanceolate, 4.5 to 6.5 (average 5) mm. long.

7. C. praticola, Rydberg. — Figs. 17, 18. — Culms smooth and slender, 3 to 6 dm. high, overtopping the smoothish flat (2 to 3.5 mm. broad) leaves; *spike slender, flexuous, moniliform, the 3 to 7 silvery brown mostly remote pointed spikelets few-flowered*, 7 to 1.7 mm. long, mostly *long-clavate at base;* perigynia nerveless or minutely short-nerved on the inner face, equalling the ovate-lanceolate acutish or blunt scales. — Mem. N. Y. Bot. Gard. i. 84; Britton, Man. 226. *C. pratensis*, Drejer, Rev. Crit. Car. Bor. 24; Fl. Dan. xiv. 8, t. 2368; Bailey, Proc. Am. Acad. xxii. 147; Britton, in Britt. & Brown, l. c. 354, fig. 858; not Hose. *C. adusta*, var. *minor*, Boott in Hook. Fl. Bor.-Am. ii. 215, & Ill. iii. 119, t. 383. *C. Liddoni*, in part, of authors, not Boott. — Open woods, clearings, and prairies, Labrador to Saskatchewan and British Columbia, south to Nova Scotia, Aroostook County, Maine, Lake Superior, and North Dakota; also in Greenland. June–Aug.

*** * Mature perigynia distinctly more than one-third (.44 to .75) as broad as long.**

– Perigynia one-fifth to one-third (.19 to .34) as thick as broad (rarely thicker in *C. mirabilis*).

–– Mature perigynia 3 to 4 mm. long (very rarely longer in *C. mirabilis* and *C. albolutescens*).

= Mature perigynia with roseate-spreading tips.

8. C. CRISTATA, Schweinitz. — Figs. 19 to 21. — *Culms* 1 m. or less high, *harsh above : leaves soft and flat, 3 to 7 mm. broad*, often equalling the culms, *sheaths loose : spike* usually *dense, linear-cylindric or oblong*, of 6 to 15 *globose closely flowered* greenish or dull-brown *spikelets* 0.5 to 1 cm. long. — Ann. Lyc. N. Y. i. 66; Schwein. & Torr. Ann. Lyc. N. Y. i. 315, t. 24, fig. 1; Dewey, l. c. 44; Boott, l. c. 117, in part; Gray, Man. ed. 5, 579; Boeckeler, l. c. 115; Howe, l. c. 41. *C. lagopodioides*, var. *cristata*, Carey, l. c. 545. *C. straminea*, var. *cristata*, Tuck. l. c. 9, 18. *C. tribuloides*, var. *cristata*, Bailey, Proc. Am. Acad. xxii. 148, in Gray, Man. ed. 6, 620, & Mem. Torr. Cl. i. 55; Macoun, l. c. 130. *C. cristatella*, Britton, l. c. 357, fig. 865. — Swales and wet woods, western NEW ENGLAND to PENNSYLVANIA, "VIRGINIA," MISSOURI, SASKATCHEWAN, and BRITISH COLUMBIA. June–Aug.

= = Mature perigynia with ascending tips.

***a.* Plant stout and stiff : spikes stiff and upright ; the gray-green mostly approximate spikelets with appressed firm perigynia.**

9. C. ALBOLUTESCENS, Schweinitz. — Figs. 22 to 24. — Culms 2 to 8 dm. high : *leaves* erect, long-pointed, *pale green*, 2 to 5 mm. wide, shorter than the culms : spike linear-cylindric to subglobose, with or without elongated bracts, of 3 to 30 (sometimes compound) conic-ovoid to subglobose spikelets 0.6 to 1 cm. long : *perigynia 2 to 3 mm. broad, rhombic-ovate to suborbicular, with a short deltoid firm greenish tip.* — Ann. Lyc. N. Y. i. 66; Bailey, Bull. Torr. Cl. xx. 422 (incl. var. *cumulata*); Britton, l. c. 359, fig. 873; Howe, l. c. 43. *C. foenea*, Ell. Sk. ii. 533; Schwein. & Torr. l. c. 315; Carey, l. c. 546; Boott, l. c. 118 (excl. vars.), t. 375; not Willd. *C. straminea*, var. *foenea*, Torr. Ann. Lyc. N. Y. iii. 395; Bailey, Proc. Am. Acad. xxii. 150, & in Gray, Man. ed. 6, 622; Macoun, l. c. 132. *C. straminea*, var. *intermedia*, Gay, Ann. Sci. Nat. ser. 2, x. 364. *C. leporina*, var. *bracteata*, Liebmann, Mex. Halv. 76. *C. straminea*, var. *chlorostachys*, Boeckeler, l. c. 118. *C. straminea*, var. *cumulata*, Bailey, Mem. Torr.

Cl. i. 23, & in Gray, l. c. — Damp or even very dry soil, principally on the coastal plain, NEW BRUNSWICK to FLORIDA, TEXAS, MEXICO, and CENTRAL AMERICA; rarely inland to Bear Mt., Livermore, MAINE (*Kate Furbish*); Mt. Monadnock, alt. 925 m., NEW HAMPSHIRE (*R. M. Harper*); Taghkanick Range, Columbia Co., NEW YORK (*L. H. Hoysradt*); also from LAKE HURON to MANITOBA. July–Sept.

b. **Plant not very stiff: the bright green or brownish spikelets with spreading or ascending (not appressed) perigynia.**

1. Leaves 2.5 to 6 mm. wide: culms 0.3 to 1.5 m. high.

10. C. MIRABILIS, Dewey. — Figs. 25, 26. — *Culms very loose and smooth;* leaves soft and thin, the sheaths rather loose: *spikelets* 4 to 12, greenish, subglobose or ovoid, 5 to 9 mm. long, *mostly approximate in an oblong spike;* perigynia with divergent tips. — Am. Jour. Sci. xxx. 63, t. Bb, fig, 92; Boott, l. c. 117 (under *C. cristata*), t. 374; Howe, l. c. 46. *C. straminea*, var. *mirabilis*, Tuck. l. c. 9, 18; Bailey, Proc. Am. Acad. xxii. 150, & in Gray, Man. ed. 6, 621; Britton, l. c. 358. *C. festucacea*, var. *mirabilis*, Carey, l. c. 545. *C. cristata*, Kunze, Car. t. 44, figs. *a*, *e*, and *f* (colored), not Schwein. *C. cristata*, var. *mirabilis*, Gray, Man. ed. 5, 580. *C. lagopodioides*, var. *mirabilis*, Olney, Exsicc. fasc. ii, no. 9. *C. tribuloides*, var. *cristata*, Macoun, l. c. 130, in part, not Bailey. — Dry banks, open woods, or even moist copses, central MAINE to MANITOBA, south to NORTH CAROLINA and MISSOURI. June, July.

Var. **perlonga**. — Fig. 27. — *Spikelets scattered in a moniliform spike.* — NEW HAMPSHIRE, dry thicket, Barrett Mt., New Ipswich, June 5, 1896 (*M. L. Fernald*): VERMONT, Little Notch, July 9, 1901 (*E. Brainerd*): MASSACHUSETTS, Stoneham, June 5, 1887 (*F. S. Collins*); Oak Island, Revere, July 5, 1891 (*W. P. Rich*); Beaver Brook Reservation, July 6, 1894 (*C. W. Swan*); Sharon, June 17, 1896 (*W. P. Rich*): CONNECTICUT, dry open woods, Southington, June 17, 1900 (*C. H. Bissell*): NEW YORK, Binghamton, June 29, 1871 (*Wm. Boott*); Sacondago River (*J. V. Haberer*): MICHIGAN, Grosse Isle, June 30, 1867 (*Wm. Boott*); open swales, Lansing, June 8, 1886 (*L. H. Bailey*, no. 283, in part): ILLINOIS, Marion Co. (*M. S. Bebb*).

Var. **tincta**. *Spike of 3 to 7 ovoid approximate brown-tinged spikelets: scale brown* with a pale margin. — NEW BRUNSWICK, banks of St. John River, July 4, 1899 (*J. Macoun*, Herb. Geol. Surv. Can. no. 22): MAINE, Fort Kent, June 16, 1898 (no. 2158), Masardis, June 6, 1898 (no. 2159), Ashland, June 13, 1898 (no. 2160), Fort Fairfield,

July 12, 1893 (no. 165), Foxcroft, June 25, 1894, Dover, June 28, 1894, Orono, July 6, 1891, — all coll. *M. L. Fernald ;* Sangerville, July 17, 1896 (*G. B. Fernald*, no. 176) : NEW HAMPSHIRE, between Marshfield and Fabyans, July 6, 1878, Bethlehem, June 20, 1887 (*E. & C. E. Faxon*) ; Whitefield, July 3, 1896 (*W. Deane*) : VERMONT, St. Johnsbury, June 21, 1901 (*T. E. Hazen*, no. 206). Resembling northwestern forms of the polymorphous *festiva* group, but not satisfactorily referable to any of them.

2. Leaves 0.5 to 2 mm. wide : culms 3 to 7 dm. high : spikelets remote or at least distinct in a moniliform or linear-cylindric spike.

11. C. STRAMINEA, Willd. — Figs. 28, 29. — *Culms very slender,* smooth except at summit : *spikelets* 3 to 8, yellow-brown, or rarely green, ovoid or subglobose, 4 to 8 mm. long, *usually forming flexuous spikes : perigynia with ascending inconspicuous tips ; the inner faces 3- to 5-nerved or nerveless.* — Willd. in Schkuhr, Riedgr. 49, t. G, fig. 34; Bailey, Mem. Torr. Cl. i. 21, & in Gray, Man. ed. 6, 621 ; Britton, l. c. fig. 868 ; Howe, l. c. 44. *C. straminea*, var. *minor*, Dewey, Am. Jour. Sci. xi. 318, t. N, fig. 45 ; Torr. l. c. 395. *C. festucacea*, var. *tenera*, Carey, l. c. 545. *C. straminea*, var. *tenera*, Boott, l. c. 120, t. 384 (except perigynia from Olney) ; Gray, Man. ed. 5, 580 ; Macoun, l. c. 132. — Meadows, or occasionally on dry banks or in open woods, NEW ENGLAND to BRITISH COLUMBIA, KENTUCKY and ARKANSAS. June–Aug.

Var. **echinodes**. — Fig. 30. — *Tips of the slightly longer perigynia divergent and conspicuous.* — ONTARIO, Wyoming, June 24, 1901 (*J. Macoun*, Herb. Geol. Surv. Can., no. 26,624) : MICHIGAN, Detroit, July 20, 1867 (*H. P. Sartwell*), June 26, 1870, and June 22, 1873 (*Wm. Boott*) : IOWA, Ames, 1872, Spirit Lake, June 21, 1881 (*J. C. Arthur*). Superficially resembling *C. tribuloides*, var. *reducta.*

++ ++ Mature perigynia more than 4 mm. long (very rarely shorter in exceptional individuals of *C. tenera*, var. *invisa*, and *C. festucacea*, var. *brevior*).

= Perigynia elongate-ovate, about half as broad as long (suborbicular in var. *Richii*).

12. C. TENERA, Dewey. — Figs. 31, 32. — Culms slender and flexuous, sharply angled, smooth except at summit, 3 to 9 dm. high : leaves shorter than or rarely exceeding the culms, very ascending, 1 to 2.5 mm. broad : *spike slender*, *moniliform* (or on late culms more or less congested), *of 3 to 9 broadly ovoid brownish spikelets 8 to 12 mm. long*, with

or without subtending elongated bracts: *perigynia* ascending or rarely spreading, *distinctly about 10-nerved on either face, 4.8* to *6* (*average 5.2*) *mm. long:* scales lance-attenuate or aristate. — Am. Jour. Sci. viii. 97, & ix. t. C, fig. 9; Britton, l. c. fig. 870. *C. straminea*, var. *aperta*, Boott, l. c. 120, t. 385; Gray, Man. ed. 5, 580; Bailey, Proc. Am. Acad. xxii. 152, & in Gray, Man. ed. 6, 622; Macoun, l. c. 133; Howe, l. c. 45. *C. tenera*, var. *major*, Olney, l. c. no. 15. *C. straminea*, var. *tenera*, Bailey, Bot. Gaz. x. 381, & Mem. Torr. Cl. v. 94. — Brackish or fresh marshes, mostly near the coast, Gulf of St. Lawrence to Delaware and Iowa; also in British Columbia, Yellow Head Pass (*Spreadborough*, Herb. Geol. Surv. Can. no. 20,871). June–Aug.

Var. invisa, Britton. — Figs. 35, 36. — Lower; with *spikelets 5 to 8 mm. long*, and perigynia 4 to 5 (average 4.5) mm. long. — Britton, l. c. 358. *C. straminea*, var. *invisa*, W. Boott, Bot. Gaz. ix. 86; Bailey, Proc. Am. Acad. xxii. 152, & in Gray, Man. ed. 6, 622; Howe, l. c. — Range of the species and too often intergrading with it; mostly in dry soil or even in pure sand.

Var. **Richii.** — Figs. 33, 34. — *Perigynia* 4 to 5 mm. long, *with suborbicular bodies* abruptly contracted to slender *conspicuous loosely ascending or spreading beaks.* — Massachusetts, Reading, June 14, 1883 (*C. E. Perkins*); Fresh Pond, Cambridge, June 8, 1887 (*W. Deane*); near Spot Pond, and north end of Doleful Pond, Stoneham, May 30, 1894, near Bear Hill, Stoneham, June 5, 1894 (*Wm. P. Rich*); Amherst (*E. Tuckerman*): Connecticut, Newington, May, 1879 (*Chas. Wright*). In its elongate loose brown spikes and subulate- or awn-tipped narrow scales clearly an extreme form of *C. tenera*, although the perigynia when well developed suggest those of *C. festucacea.*

= = Perigynia with broadly ovate to suborbicular bodies, more than half as broad as long.

***a.* Perigynia 5.7 to 7.7 mm. long.**

13. C. Bicknellii, Britton. — Figs. 37 to 40. — Culms comparatively stout, 4 to 9 dm. high, smooth except at summit: leaves ascending, rather short and firm, 2 to 4.5 mm. broad: *spike of 3 to 7 silvery brown or greenish* ovoid obovoid or subglobose *approximate or slightly remote spikelets* 8 to 14 mm. long: *perigynia ascending, the tips becoming conspicuous, broadly wing-margined, when mature almost translucent and with about 10 nerves on either face.* — Britton, l. c. 360, fig. 874. *C. straminea*, var. *Crawei*, Boott, l. c. 121, t. 388; Bailey, Bull. Torr. Cl. xx. 422; Howe, l. c. *C. straminea*, var. *Meadei*, Boott, l. c. t. 389; Gray,

Man. ed. 5, 581. *C. straminea*, var. *brevior*, Bailey, Mem. Torr. Cl. i. 22, in part, not Dewey. — Dry or rocky soil, eastern MASSACHUSETTS to MANITOBA, NEW JERSEY, OHIO, and ARKANSAS. May–July.

b. **Perigynia at most 5.5 mm. long.**

1. **Spikelets whitish or silvery-brown, mostly scattered in a flexuous moniliform spike.**

14. C. SILICEA, Olney. — Figs. 41, 42. — *Culms slender, stiff,* smooth except at summit, 3 to 8 dm. high: *leaves erectish,* shorter than or equalling the culms, *usually glaucous,* 2 to 4.5 mm. wide, often becoming involute: *spike of 3 to 12 usually remote conic-ovoid usually clavate spikelets* 1 to 1.5 cm. long: *perigynia strongly appressed, firm and opaque,* 4 to 5 mm. long, 2.2 to 3 mm. broad, *short-beaked, broad-winged, the body distinctly 3- to 5-nerved on the inner, 6- to 12-nerved on the outer face.* — Proc. Am. Acad. vii. 393; Bailey, Mem. Torr. Cl. i. 24, & in Gray, Man. ed. 6, 621; Britton, l. c. 358, fig. 869; Howe, l. c. 44. *C. straminea,* var. *moniliformis,* Tuck. l. c. 9, 17; Bailey, Proc. Am. Acad. xxii. 151; Macoun, l. c. 133. *C. adusta,* Carey in Gray, Man. ed. 2, 516, not Boott. *C. foenea,* var. γ, Boott, l. c. 118, t. 377. *C. foenea,* var. (?) *subulonum,* Gray, Man. ed. 5, 580. *C. straminea,* var. *silicea,* Bailey, Carex Cat. 4. — Sand and rocks near the sea, PRINCE EDWARD ISLAND to NEW JERSEY. June–Aug.

2. **Spikelets green or brownish, approximate or only slightly remote in a mostly upright spike (*C. tenera,* var. *Richii,* with moniliform flexuous spikes might be looked for here).**

○ **Sheath of the leaf green and strongly nerved nearly or quite to the narrow subchartaceous auricle: perigynia appressed-ascending: achenes mostly oblong.**

15. C. ALATA, Torr. — Figs. 43, 44. — Culms rather stout, smooth except at summit, 0.5 to 1 m. high: *leaves* mostly short and *harsh,* 2.5 to 4.5 mm. wide: *spike oblong or ovoid, of 3 to 8 compact green* or finally dull-brown *conic-ovoid to oblong spikelets* 8 to 15 mm. long: *perigynia firm and opaque, orbicular or obovate,* 4.3 to 5.5 mm. long, *2.8 to 3.7 mm. broad, broad-winged, very faintly nerved or nerveless, much broader than the lance-subulate usually rough-awned scales.* — Ann. Lyc. N. Y. iii. 396; Boott, l. c. 118, t. 378; Gray, Man. ed. 5, 581; Britton, l. c. 359, fig. 872; Howe, l. c. 45. *C. straminea,* var. *alata,* Bailey, Carex Cat. 4, Proc. Am. Acad. xxii. 150 & in Gray, Man. ed. 6, 622. — Marshes and wet woods, NEW HAMPSHIRE to MICHIGAN and FLORIDA, mostly near the coast. June, July.

Var. **ferruginea.** — Figs. 45, 46. — Slender: *the 3 to 5 irregularly clustered spikelets tawny or ferrugineous* from the first: *perigynia ovate,* 4 to 5 mm. long, *2.3 to 2.8 mm. broad: scales lance-ovate, mostly awnless.* — *C. foenea,* var. β, Boott, l. c. 118, t. 376. *C. foenea,* var.? *ferruginea,* Gray, Man. ed. 5, 580. *C. tenera,* var. *suberecta,* Olney, Exsicc. fasc. ii. no. 16. *C. straminea,* var. *ferruginea,* Bailey, Bull. Torr. Cl. xx. 421.— Ohio to Michigan, Illinois, and Iowa.

○○ **Sheath with a thin barely nerved or nerveless pale band extending down from the membranaceous auricle: perigynia spreading-ascending: achenes suborbicular.**

16. C. FESTUCACEA, Schkuhr. — Figs. 47, 48. — *Culms stiff, 0.5 to 1 m. high: leaves stiff,* erect, shorter than the culms, 2 to 4 mm. wide: *spike* narrowly oblong, rarely ovoid, *of 5 to 10 distinct or rarely approximate subglobose or broadly ovoid-conic yellow-brown or green-brown ascending spikelets* 7 to 12 mm. long: *perigynia* broad-ovate to suborbicular, 4 to 5.5 mm. long, 2.7 to 3.5 mm. broad, *strongly 7- to 15-nerved on the outer,* nerveless or faintly nerved on the inner *face*: scales blunt. — Schkuhr in Willd. Sp. iv. 242, & Riedgr. Nachtr. 23, t. Www. fig. 173; Dewey, Am. Jour. Sci. viii. 96; Schwein. & Torr. l. c. 316; Torr. l. c. 394; Carey, l. c. 545; Britton, l. c. 359, in part. *C. straminea,* var. *festucacea,* Tuck. l. c. 9, 18; Boott, l. c. 120, t. 386; Macoun, l. c. 132; Bailey, Mem. Torr. Cl. v. 94, in part; Howe, l. c. *C. straminea,* Bailey, Proc. Am. Acad. xxii. 149, in part, not Willd. *C. straminea,* var. *brevior,* Bailey, Mem. Torr. Cl. i. 22, in part, not Dewey. — Dry or rocky soil, Maine to Manitoba and Pennsylvania. June–Aug.

Var. **brevior.** — Figs. 49 to 51. — *Lower* (rarely more than 0.6 m. high), *and more slender: spikelets 3 to 6, approximate or subapproximate.* — *C. straminea,* Schkuhr, Riedg. Nachtr. 23, t. Xxx, fig. 174; Schwein. & Torr. l. c. 314; Carey, l. c. 546; Torr. l. c. 395; Boott, l. c. 121, t. 387; Bailey, Proc. Am. Acad. xxii, 149, in part; not Willd. in Schkuhr, Riedgr. 49, t. G. fig. 34, & in herb. *C. straminea,* var. *brevior,* Dewey, Am. Jour. Sci. xi. 158; Bailey, Mem. Torr. Cl. i. 22, in part, & in Gray, Man. ed. 6, 622; Howe, l. c. *C. straminea,* var. *Schkuhrii,* Gay, Ann. Sci. Nat. ser. 2, x. 363; Tuck. l. c. 8, 17. *C. straminea,* var. *typica,* Gray, Man. ed. 5, 580; Macoun, l. c. 131. *C. festucacea,* Britton, l. c. 359, in part (including fig. 871), not Schkuhr.— Commoner than the species, extending to British Columbia, Arkansas, &c. May–July.

+– +– Perigynia two-fifths to one-half (.40 to .50) as thick as broad.

++ Tips of the perigynia distinctly exceeding the scales: spikes short, compact, ovoid or short-oblong, brown: perigynia 3 to 3.5 mm. long.

17. C. Bebbii, Olney. — Figs. 52, 53. — Culms rather slender, 2 to 6 dm. high, smooth except at tip: *leaves* mostly shorter, *ascending but not stiff*, 1.75 to 4.5 mm. wide: *spikes 1 to 2 cm. long*, of 3 to 12 globose or ovoid-oblong ascending *spikelets 5 to 8 mm. long: perigynia* narrowly ovate, *mostly dull brown and loosely ascending, faintly few-nerved or nerveless, 1.5 to 2 mm. broad:* scale oblong, bluntly acuminate. — Exsicc. fasc. ii, no. 12, as *nomen nudum*. *C. tribuloides*, var. *Bebbii*, Bailey, Mem. Torr. Cl. i, 55 & in Gray, Man. ed. 6, 620; Britton, l. c. 356; Howe, l. c. 42; Cratty, Bull. Lab. Nat. Hist. Univ. Ia., iv. 359, t. 8. — Low ground, Newfoundland to western Massachusetts, central New York, Illinois, the Rocky Mts., British Columbia, and northward. June–Aug.

++ ++ Tips of the perigynia nearly or quite equalled by the scales: perigynia more than 3.5 mm. long (sometimes shorter in the *slender-spiked silvery green C. foenea*).

= Perigynia with strong nerves the entire length of the inner face (very rarely nerveless).

a Spike loose and elongated, green or silvery-brown.

18. C. foenea, Willd. — Figs. 54, 55. — *Culms slender and lax*, smooth except at tip, *3 to 9 dm. high: leaves soft and loose, pale green or glaucous*, mostly shorter, 2 to 4 mm. broad: *spike linear-cylindric or moniliform, erect or flexuous, of 4 to 9* globose or ovoid clavate-narrowed appressed-ascending *spikelets 6 to 10 mm. long: perigynia ovate, 3 to 4 mm. long*, 1.8 to 2.2 mm. broad, appressed-ascending, finally a little spreading. — Enum. 957; Bailey, Mem. Torr. Cl. i. 25, & in Gray, Man. ed. 6, 621; Macoun, l. c. 377; Britton l. c. 357, fig. 867; Howe, l. c. 43. *C. argyrantha*, Tuck. in Herb. distr. (1859). *C. adusta*, Boott, l. c. 119, in part, t. 382, fig. 2, not Boott in Hook. Fl. Bor.-Am. ii. 215. *C. albolutescens*, var. *argyrantha*, Olney, Exsicc. fasc. i. no. 9. *C. adusta*, var. *argyrantha*, Bailey, Carex Cat. 2. — Dry woods and rocky banks, Maine to British Columbia and Maryland. July.

Var. perplexa, Bailey. — Figs. 56, 57. — *Coarser*, and often taller: *spikes heavier, mostly nodding, the 6 to 15 spikelets larger, 1 to 1.7 cm. long, the terminal ones often crowded: perigynia 3.5 to 4.4 mm. long.* — Mem. Torr. Cl. i. 27, in part, & in Gray, Man. Ed. 6, 621; Britton,

l. c.; Howe, l. c. 44. *C. adusta*, Boott, Ill. iii. 119, in part, t. 381, 382, fig. 1; Gray, Man. ed. 5, 580; Macoun, l. c. 129, in part (excl. syn.) — Commoner than the species. NEWFOUNDLAND to MANITOBA and VIRGINIA. June–Aug.

b. Spike with approximate or subapproximate brown or ferrugineous spikelets.

19. C. LEPORINA, L. — Figs. 58 to 60. — Culms stiff and ascending, 2 to 8 dm. high: leaves mostly short and rather firm, 1.5 to 4 mm. broad: spike from subglobose to cylindric, of 3 to 6 obovoid to oblong-ovoid ascending spikelets 8 to 1.4 mm. long: perigynia 3.8 to 4.5 mm. long, 1.8 to 2.3 mm. broad, ascending. — Sp. 973, & Fl. Suec. ed. 2, 326 (excl. cit. Fl. Lapp.); Wahl. Fl. Lapp. 228; Reich. Ic. Fl. Germ. viii. t. 211; Anders. Cyp. Scand. 63, t. 4, fig. 26; Boott, l. c. iv. 190; Bailey, Proc. Am. Acad. xxii. 152, & in Gray, Man. ed. 6, 622; Britton, l. c. 356, fig. 864; Meinsh. Acta Hort. Petrop. xviii. 324. *C. ovalis*, Good. Trans. Linn. Soc. ii. 148; Eng. Bot. t. 306; Vahl. Fl. Dan. vii. t. 1115; Host, Gram. i. 39, t. 51; Willd. l. c. 955; Schkuhr, l. c. 20, t. B, fig. 8. — EUROPE and ASIA: NEWFOUNDLAND, shores of Quiddy Viddy Lake, Aug. 2, 1894 (*Robinson & Schrenk*): NOVA SCOTIA, Yarmouth, July 22, 1896 (*E. Brainerd*): MAINE, low, rocky pasture, South Berwick, June 23, 1898 (*J. C. Parlin*, no. 959); hillside pastures, East Parsonsfield, July 4, 1900 (*J. F. Collins & M. L. Fernald*): NEW HAMPSHIRE, dry hillsides, Alstead, July 9, 1901 (*M. L. Fernald*); Gap Mt., Troy, June 13, 1898 (*E. L. Rand & B. L. Robinson*, no. 508): MASSACHUSETTS, Essex Co., Aug. 23, 1881 (*W. P. Conant*); Long Island, Boston Harbor, July 6, 1871, July 1, 1873 (*Wm. Boott*); Nobscot Hill, Framingham, June 14, 1901 (*M. L. Fernald*); Purgatory Swamp, Dedham, June 23, 1878 (*E. & C. E. Faxon*): NEW YORK, slopes of Bald Mt., north of Fulton Chain, Herkimer & Hamilton Cos., Aug. 12, 1895 (*J. V. Haberer*, no. 1103) NEW JERSEY, ballast ground, Camden, 1878 (*Isaac Burk*). Doubtless introduced at the latter station, but perhaps indigenous northward.

= = Inner face of perigynia nerveless or only slightly nerved at base (exceptional individuals of *C. leporina* might be sought here).

a. Ellipsoidal spikelets brownish-white: the appressed perigynia golden-yellow at base.

20. C. XERANTICA, Bailey. — Figs. 61, 62. — *Culms stiff*, scabrous above, 3 to 6 dm. high: *leaves short, mostly near the base*, 2 or 3 mm. broad: *spike linear-cylindric, of 3 to 6 distinct ascending spikelets* 8 to

13 mm. long: perigynia 4 to 4.8 mm. long, 2 to 2.3 mm. broad. — Bot. Gaz. xvii. 151; Britton, l. c. 355, fig. 859. — Open prairies, western MANITOBA and adjacent ASSINIBOIA. July.

b. Obovoid spikelets brownish or ferrugineous: the loosely ascending perigynia dark green or brown when mature.

1. Spike loose and flexuous; spikelets mostly long-clavate at base, the lowest remote: achene 1.5 (1.3 to 1.7) mm. broad.

21. **C. aenea.** — Figs. 63 to 66. — *Culms* smooth and wiry, but *more or less flexuous at tip*, 0.25 to 1.2 m. high: leaves much shorter, rather soft and flat, 2 to 4 mm. broad: *spike loosely cylindric or moniliform*, of 3 to 12 *spikelets 0.8 to 2.5 cm. long* (in luxuriant plants often peduncled or compound): perigynium 4 to 5 mm. long, 1.9 to 2.7 mm. broad. — *C. adusta*, Boott, l. c. iii. 119, in part, t. 380, not Boott in Hook. Fl. Bor.-Am. ii. 215. *C. albolutescens*, var. *sparsiflora*, Olney, fasc. v. no. 11, in part (as *nomen nudum*), not *C. sparsiflora* Fries. *C. adusta*, var. *sparsiflora*, Bailey, Carex Cat. 2 (as *nomen nudum*)? *C. foenea*, var. *perplexa*, Bailey, Mem. Torr. Cl. i. 27, as to syn., in part. *C. foenea*, var. *sparsiflora*, Howe, l. c. 44. — Open woods, dry banks, or rarely in low ground. LABRADOR, without station, Aug. 23, 1896 (*Spreadborough*, Herb. Geol. Surv. Can. no. 13,354): UNGAVA, East Main R., 1892 (*A. H. D. Ross*, Herb. Geol. Surv. Can. no. 30,582): NEWFOUNDLAND, Grand Lake, Bay of Islands, Aug. 6, 1897 (*A. C. Waghorne*): QUEBEC, Rivière du Loup, July 23, 1861 (*Wm. Boott*), Aug. 2, 1896 (*E. Brainerd*): Calumet, June, 1891 (*J. M. Macoun*, Hb. Geol. Surv. Can. no. 16,535): NEW BRUNSWICK, Kent Co. (*J. Fowler*, in Olney, Exsicc. fasc. v. no. 11, in part): MAINE, Fort Fairfield, 1881 (*Kate Furbish*); Milford, June 30, 1864 (*J. Blake*); Orono, July 7, 1892, July 3, 1897, June 8, 1901 (*M. L. Fernald*); Mt. Desert Island, numerous stations (*Rand*, *Faxon*, *Williams et al.*): NEW HAMPSHIRE, Franconia, June 23, 1888 (*E. & C. E. Faxon*); Crawford Notch, July 16, 1895 (*G. G. Kennedy*): VERMONT, East Mt., Middlebury, June 23, 1882, Moosalamoo Mt., Salisbury, July 5, 1901 (*E. Brainerd*); MASSACHUSETTS, Mt. Wachusett, June 27, 1878 (*Wm. Boott*): NEW YORK, base of Stony Creek Mt., June 29, 1899 (*Rowlee, Wiegand & Hastings*): ONTARIO, near Michipicoten, July 26, 1869, Cache Lake, July 12, 14, 1900 (*J. Macoun*); Lake Victoria, Sept. 12, 1901 (*E. Brainerd*): MICHIGAN, Isle Royale (*H. Gillman*): ATHABASCA, Methy Portage (*Sir John Richardson*, fide Boott, Ill. t. 380): ALBERTA, Banff, Rocky Mts., July 10, 1891 (*J. Macoun*, Herb.

Geol. Surv. Can. no. 16, 536): British Columbia, Beaver Creek, Selkirk Mts., July 13, 1885 (no. 10,797); Kicking Horse Lake, Aug. 11, 1890 (no. 30,603); Revelstoke, May 19, 1890 (no. 30,604) — *J. Macoun*, Herb. Geol. Surv. Can.

2. Spike dense and stiff, erect; spikelets full and rounded at base, mostly approximate: achene 2 (1.8 to 2 1) mm. broad.

22. C. ADUSTA, Boott. — Figs. 67 to 69. — *Culms* smooth, *stiffly erect*, 2 to 8 dm. high: leaves usually shorter, 2 to 5 mm. broad: *spike ovoid to cylindric, usually subtended by a stiff rather prominent bract*, of 3 to 15 simple or compound *spikelets 6 to 12 mm. long:* perigynia 4 to 5 mm. long, 2 to 3 mm. broad. — Boott in Hook. Fl. Bor.-Am. ii. 215, & Ill. iii. 119, in part, t. 379; Bailey Mem. Torr. Cl. i. 24, & in Gray, Man. ed. 6, 621; Britton, l. c. 357, fig. 866. *C. albolutescens*, var. *glomerata*, Olney, Exsicc. fasc. v. no. 10. *C. adusta*, var. *glomerata*, Bailey, Carex Cat. 2, Bot. Gaz. ix. 139, & Proc. Am. Acad. xxii. 149. *C. pinguis*, Bailey, Bull. iii. Geol. and Nat. Hist. Surv. Minn. 22; Macoun, l. c. 129. — Dry woods, rocky banks and recent clearings, Newfoundland to Mount Desert Island, Maine, west to Minnesota, Assiniboia, Saskatchewan, and Keewatin. June–Sept.

§§ Cyperoideae. Bracts leaf-like and much prolonged, forming a conspicuous involucre.

23. C. SYCHNOCEPHALA, Carey. — Figs. 70, 71. — Culms smooth, 2 to 6 dm. high: *leaves soft*, ascending, 2 to 4 mm. wide; *bracts unequal, the lowest longest, 1 to 2 dm. long: spikelets* 4 to 10, oblong, 8 to 15 mm. long, *forming a dense ovoid or oblong spike: perigynia lance-subulate*, 5 mm. long, barely 1 mm. wide, firm, slightly nerved or nerveless. — Am. Jour. Sci. Ser. 2, iv. 24, & in Gray, Man. 545; Boott, Ill. i. 46, t. 118; Bailey, Proc. Am. Acad. xxii. 153; Macoun, l. c. 121; Britton, l. c. 360, fig. 875; Howe, l. c. 46; Cratty, Bull. Lab. Nat. Hist. Univ. Ia., iv. 363, t. 9. *C. cyperoides*, Dewey, Am. Jour. Sci. Ser. 2, iii. 171, not L. — Meadows, ditches, and wet sandy soil, locally from central New York to the Ottawa River (Canada), Iowa, Saskatchewan, and British Columbia. July, Aug.

Astrostachyae, Holm. Monoecious or dioecious, the spikelets often purely staminate or purely pistillate, or with the flowers variously mixed. Bract not sheathing, if present short and filiform. *Perigynia horizontally spreading or reflexed at maturity, spongy at base*, glabrous, nervose, distinctly pointed or beaked, *with thin margins* and bidentate apex.

*** Spikelets terminal and solitary (rarely one or two secondary ones below): plants usually dioecious.**

+ Culms filiform or setaceous, solitary or few from filiform creeping stoloniferous rootstocks.

24. C. GYNOCRATES, Wormskiold. — Figs. 72 to 77. — *Culms* 0.6 to 3 dm. high, *mostly exceeding the setaceous leaves:* spikelets 0.5 to 2 cm. long, some staminate and linear or linear-lanceolate, with oblong mostly blunt-pointed scales; others staminate above, with 1 or more pistillate flowers below; others oblong, strictly pistillate, with 6 to 12 *rather plump subterete, but thin-edged strongly nerved conic-beaked perigynia.* — Wormsk. in Drejer, Rev. 16; Fries, Mant. iii, 134, & Sum. 222; Anders. Cyp. Scand. 71, t. 3, fig. 8; Kunze, Car. 123, t. 31, fig. 1; Carey, in Gray, Man. ed. 2, 509; Boott, Ill. iv. 143, t. 459, 460; Bailey, Proc. Am. Acad. xxii. 142, & in Gray, Man. ed. 6, 617; Macoun, l. c. 109; Howe, l. c. 49 (incl. var. *monosperma*, Peck); Holm, l. c. 209. *C. Redowskiana*, Bailey, Mem. Torr. Cl. v. 89; Britton, l. c. 340, fig. 815; not C. A. Meyer, according to Meinshausen, Acta Hort. Petrop. xviii. 305. *C. dioica*, Schwein. & Torr. l. c. 293; Dewey, l. c. Ser. 1, x. 283; Carey, in Gray, Man. 537; not L. *C. monosperma*, Macoun, in Bailey, Carex Cat. 3, *nomen nudum*. *C. alascana*, Boeckeler, Engler's Bot. Jahrb. vii. 277, acc. to Bailey. — Swamps and bogs, LABRADOR to ALASKA, south mostly in *Thuya* swamps to Restigouche Co., NEW BRUNSWICK; Aroostook and Piscataquis Cos., MAINE; Herkimer, Yates and Genessee Cos., NEW YORK; Alleghany Co., PENNSYLVANIA; and Alcona and Oscoda Cos., MICHIGAN; in the Rocky Mts. to COLORADO: also in northern EUROPE and ASIA. June, July.

+ + Culms stouter, rigid, forming strongly caespitose stools without stolons.

25. C. EXILIS, Dewey. — Figs. 78 to 83. — *Culms wiry*, 2 to 7 dm. high, usually much exceeding the *filiform stiff leaves:* spikelets mostly solitary, 1 to 3 cm. long, staminate, or pistillate, or with the flowers variously situated: *perigynia* ovate-lanceolate, *with serrulate thin margins, strongly convex on the outer, flattish and few-nerved or nerveless on the inner face.* — Am. Jour. Sci. xiv. 351, t. Q, fig. 53; Carey, l. c. 538; Boott, Ill. i. 17, t. 47; Bailey, Proc. Am. Acad. xxii. 142, & in Gray, Man. ed. 6, 617; Macoun, l. c. 111; Britton, l. c., 340, fig. 816; Howe, l. c. 38; Holm, l. c. 207. *C. exilis*, var. *squamacea*, Dewey, l. c. fig. 54. *C. exilis*, var. *androgyna*, Dewey, in Wood, Class-book, ed.

1861, 750. — Bogs and meadows near the coast, or on the coastal plain, locally from LABRADOR and NEWFOUNDLAND, to NEW JERSEY: also summit of Smoky Mt., Cape Breton, NOVA SCOTIA; Crystal, MAINE; Bristol and Peacham, VERMONT; Essex and Onondaga Cos., NEW YORK; Mer Bleue, ONTARIO; Calumet, MICHIGAN; and reported from Hennepin and Crow Wing Cos., MINNESOTA. May–Aug.

*** * Spikelets 2 to several, the staminate flowers mostly at their bases; plants very rarely dioecious.**

– Perigynia broadest at the rounded or subcordate base; the beak rough or serrulate.

–– Perigynia .40 to .50 as broad as long, the slender beak conspicuous, often nearly as long as the body: scales pointed.

26. C. ECHINATA, Murray. — Figs. 84 to 88. — *Culms rather wiry*, 1 to 4 dm. high: leaves shorter than or equalling the culms, 1 to 2.5 mm. wide: *spike* linear-cylindric, *1 to 3 cm. long*, *of 2 to 6 subapproximate* or slightly remote subglobose or oblong *3- to 12- flowered spikelets*: *perigynia finally yellowish*, *narrowly ovate*, early ascending, later wide-spreading, faintly nerved or nerveless on the inner face, *3 to 4 mm. long*, one-third or one-half exceeding the ovate pointed brownish scale. — Prodr. 76; Boeckeler, Linnaea, xxxix. 124; Bailey, Proc. Am. Acad. xxii. 142; Mem. Torr. Cl. i. 57, & Bull. Torr. Cl. xx. 424; Macoun, l. c. 126; Richter, Pl. Eur. i. 150; Holm, l. c. 212. *C. muricata*, Huds. Fl. Ang. 406 (1778); Leers, Fl. Herb. 200, t. 14. fig. 8; not L. *C. Leersii*, Willd. Prodr. 28. *C. stellulata*, Gooden. Trans. Linn. Soc. ii. 144; Schkuhr, Riedgr. 45, t. C, fig. 14; Host, Gram. i. 41, t. 53; Schwein. & Torr. l. c. 317; Reich. Ic. Fl. Germ. viii. 9, t. 214, fig. 560; Carey in Gray, Man 544; Boott, Ill. i. 55. *Vignea stellulata*, Reich. Fl. Exc. 57. *C. sterilis*, Gray, Man. ed. 5, 578; Bailey, Bull. Torr. Cl. xx. 424; Britton, l. c. 350, fig. 844; Howe, l. c. 38; not Willd. — Open low ground, LABRADOR and UNGAVA to ALASKA, south to Garrett Co., MARYLAND, OHIO, MICHIGAN, SASKATCHEWAN, and Humboldt Co., CALIFORNIA: also in EUROPE and ASIA. June–Aug. Extremely variable, passing by numerous transitions to the following more marked extremes.

Var. **ormantha.** — Fig. 89. — *Spikes* 2 to 6 cm. long, *of 2 to 4 very remote 3- to 9-flowered spikelets, the terminal one with a clavate base 0.5 to 1 cm. long:* perigynia as in the species, spreading or slightly ascending, mostly twice as long as the scales. — *C. echinata*, W. Boott, in Wats. Bot. Cal. ii. 237, in part. — RHODE ISLAND, Providence, 1846

(*Geo. Thurber*); CONNECTICUT, without locality (*Chas. Wright*); Southington, June 5, 1898 (*C. H. Bissell*); Waterford, May 29, 1889 (*C. B. Graves*): OREGON, without locality, 1871 (*E. Hall*, no. 582): CALIFORNIA, bogs along Strawberry Creek, El Dorado Co., alt. 1,815 m., July 18, 1897 (*E. Brainerd*, no. 160 [type]); Big Trees, Calaveras Co. (*Bolander*, no. 2324); Santa Rosa (*J. M. Bigelow*); Bluff Lake, San Bernardino Mts., alt. 2,280 m., June, 1895 (*S. B. Parish*, no. 3702).

Var. **excelsior.** — Fig. 90, 91. — *Tall* and slender, 0.3 to 1 m. high: spike 3 to 5.5 cm. long; *spikelets 3 to 9, distinct*, only the lowermost remote, *12- to 20-flowered*, at first oblong-cylindric, with the perigynia ascending, later subglobose, with strongly reflexed perigynia one-third longer than the scales. — *C. sterilis* β, Boott, Ill. i. 56, t. 146.* *C. sterilis*, var. *excelsior*, Bailey, Bull. Torr. Cl. xx. 424; Howe, l. c. — NEWFOUNDLAND to MICHIGAN and NORTH CAROLINA.

Var. CEPHALANTHA, Bailey. — Figs. 92 to 94. — *The coarsest form*, 3 to 7 dm. high: *leaves 2 to 4 mm. broad: spike* cylindric or slightly moniliform, *3 to 7.5 cm. long; the 4 to 8 broad-oblong spikelets approximate or slightly remote* (rarely 1 cm. apart), *15- to 40-flowered: perigynia ovate, one-half as broad as long*, wide-spreading or reflexed. — Mem. Torr. Cl. i. 58, & in Gray, Man. ed. 6, 618. *C. sterilis*, Boott, Ill. i. 55, t. 146. *C. sterilis*, var. *cephalantha*, Bailey, Bull. Torr. Cl. xx. 425; Britton, l. c.; Howe, l. c. 39. *C. sterilis*, var. *aequidistans*, Peck in Howe, l. c. — NEWFOUNDLAND to NORTH CAROLINA, MICHIGAN, and BRITISH COLUMBIA.

Var. ANGUSTATA, Bailey. — Figs. 95 to 97. — *Extremely slender* or almost setaceous, 1 or 2 dm. high (in shade often taller): *leaves 0.5 to 1.5 mm. wide: spike 0.75 to 2.5 cm. long; the 6 or fewer 3- to 15-flowered spikelets approximate* (or slightly remote in shade): the divaricate *perigynia lance-ovate or lanceolate, 2.5 to 3 mm. long*, twice exceeding the scales. — Mem. Torr. Cl. i. 59, & in Gray, Man. ed. 6, 618. *C. stellulata*, var. *angustata*, Carey in Gray, Man. 544. *C. sterilis*, var. *angustata*, Bailey, Bull. Torr. Cl. xx. 425; Howe, l. c. — NOVA SCOTIA to CONNECTICUT, Lake St. John, QUEBEC, ILLINOIS, and MICHIGAN.

++ Perigynia about .70 as broad as long, the beak short, one-fourth to one-half as long as the body.

= Tall: leaves 2.5 to 4.5 mm. broad: perigynia 2 to 3 mm. broad: scales sharp-pointed.

27. C. STERILIS, Willd. — Figs. 98 to 100. — *Coarse*, 1 m. or less high: leaves flat, shorter than or equalling the culms: spike 1.5 to 3.5

cm. long; *the 3 to 6 subglobose or oblong-cylindric densely 15- to 50-flowered olive-green spikelets* crowded or distinct: the *thick strongly many-nerved perigynia broad-ovate, 3 to 3.5 mm. long*, squarrose or with recurved tips. — Sp. iv. 208; Schkuhr, Riedgr. Nacht. 3, t. Mmm, fig. 146. *C. stellulata*, var. *sterilis*, Carey in Gray, Man. 544. *C. stellulata*, var. *conferta*, Chapman, Fl. 534. *C. echinata*, var. *conferta*, Bailey, Carex Cat. 2, Proc. Am. Acad. xxii. 143, Mem. Torr. Cl. i. 58, & in Gray, Man. ed. 6, 618; Macoun, l. c. 126. *C. atlantica*, Bailey, Bull. Torr. Cl. xx. 425; Britton, l. c. 350. — Bogs and damp pine-barrens, near the coast from NEWFOUNDLAND to FLORIDA, rarely inland on cold bogs, at Lake St. John, QUEBEC (*G. G. Kennedy*); Squapan, Aroostook Co., and northern flank (near Bell Camp) of Mt. Katahdin, MAINE (*Fernald*); Adirondack Mts., Essex Co., NEW YORK (*Knieskern*); and Mt. Sorrow, Valley Forge, PENNSYLVANIA (*C. E. Smith*). June, July.

= = Low: leaves 0.5 to 2 (very rarely 2.5) mm. broad: scales blunt.

28. C. INTERIOR, Bailey. — Figs. 101 to 105. — *Slender*, 1.5 to 5 dm. high; the *leaves 1 to 2 (rarely 2.5) mm. broad*, shorter than or exceeding the rather stiff culms: spike 1 or 2 cm. long; *the 2 to 5 spikelets* all fertile, all sterile, or variously mixed, usually subglobose, *4 or 5 mm. in diameter, the terminal long-clavate at base, 5- to 15-flowered: perigynia firm, plump*, olive-green or -brown, more or less nerved or almost nerveless, *broadly deltoid-ovate, obscurely short-beaked* and with slightly thickened margin, *2.3 to 3.2 mm. long, 1.5 to 2 mm. broad*, finally wide-spreading or recurved, much exceeding the oblong or ovate *blunt scales*. — Bull. Torr. Cl. xx. 426; Britton, l. c. fig. 846; Howe, l. c. 39. *C. scirpoides*, Schkuhr, Riedgr. Nacht. 19, t. Zzz, fig. 180; Willd. Sp. iv. 237; Schwein. & Torr. l. c. 317; Dewey, Am. Jour. Sci. viii. 96; not *C. scirpoidea*, Michx. *C. stellulata* γ, Torr. l. c. 392. *C. stellulata*, var. *scirpina*, Tuck. Enum. Meth., 9, not *C. scirpina*, Tuck. l. c. 8. *C. stellulata*, var. *scirpoides*, Carey in Gray, Man. 544; Boott, Ill. i. 56, t. 146.** *C. echinata*, Boeckeler, Linnaea, xxxix. 124, in part, not Murray. *C. norvegica*, E. P. Sheldon, Bull. Torr. Cl. xx. 284, & Minn. Bot. Studies, i. 224, not Wahl. In damp or wet soil, NEW BRUNSWICK to RUPERT LAND and VANCOUVER ISLAND, south to FLORIDA and ARIZONA. Commonest northward and in the interior. May–July.

Var. CAPILLACEA, Bailey. Stiff, *culms almost setaceous; leaves about 0.5 mm. broad*, often involute: *perigynia strongly nerved*. — Bull. Torr. Cl. xx. 426; Howe, l. c.; Britton, l. c. 351. — NEW HAMPSHIRE to NEW YORK, NEW JERSEY, and PENNSYLVANIA.

++ Perigynia broadest near the middle, tapering to a narrow base and a smooth beak.

29. C. SEORSA, E. C. Howe. — Figs. 106 to 109. — *Culms soft*, in loose stools, 3.5 to 6.5 dm. high: *leaves* shorter, *soft, pale*, 2 to 4 mm. broad: spikes 2.5 to 7 cm. long, of *2 to 6 mostly remote* subglobose or oblong 6- to 20-flowered green *spikelets* 3.5 to 7 mm. long, the terminal one usually with a long-clavate base, the lower often subtended by a setiform bract: *perigynia very thin and conspicuously nerved, elliptic-ovate, with a very short smooth beak* and a *narrow substipitate base*, 2.7 mm. long, 1.9 mm. broad, wide-spreading or recurved, much exceeding the acutish scales. — 48 Rep. N. Y. Mus. Nat. Hist. 40. *C. canescens*, var. *vulgaris*, Deane, Met. Park Fl. 95, not Bailey. — Wet woods and swamps, from Middlesex Co., MASSACHUSETTS to Suffolk and Oneida Cos., NEW YORK, south to DELAWARE. May, June.

Elongatae, Kunth. Spikelets remote or approximate in a simple elongated or short inflorescence. Staminate flowers at the base of the spikelets. *Perigynia ascending* when mature, glabrous, *ovate to oblong or lanceolate, plano-convex*, beaked or beakless, *not thin-winged.*

* Perigynia more or less roughened or serrulate on the upper edges (sometimes smooth in exceptional forms of *C. canescens*; and by exception obscurely toothed in rare individuals of *C. tenuiflora*).

+ Perigynia broadest at the rounded or subcordate base.

30. C. ARCTA, Boott. — Figs. 110 to 113. — *Pale green* or somewhat glaucous: *culms very soft, in loose stools*, 1.5 to 6 dm. high, often overtopped by the *soft flat leaves 2.5 to 4 mm. broad: spike oblong-cylindric*, of 5 to 13 ovoid or oblong *closely approximate or slightly remote spikelets* 6 to 11 mm. long: *perigynia ovate, with a rather definite beak*, strongly nerved on the outer, faintly on the inner face, 2 to 3 mm. long, 1.2 to 1.5 mm. broad, somewhat exceeding the acute, often brown-tinged, scales. — Ill. iv. 155, t. 497; Macoun, l. c. 124; Britton, l. c. 352, fig. 850. *C. canescens*, var. *polystachya*, Boott in Richards. Arct. Exped. ii. 344; Bailey, Proc. Am. Acad. xxii. 144, Mem. Torr. Cl. i. 75, & in Gray, Man. ed. 6, 619. *C. Kunzei*, Olney, Proc. Am. Acad. viii. 406 (excl. syn.). *C. canescens*, var. *oregana*, Bailey, Mem. Torr. Cl. i. 75. — Wet woods, alluvial thickets and swales, from the larger river-valleys of MAINE and QUEBEC, Lake Champlain, VERMONT, and the Adirondack Mts., NEW YORK to Lake Nipigon, ONTARIO, and BRITISH COLUMBIA, south to MICHIGAN, MINNESOTA, and the coast and mountains of WASHINGTON and OREGON. June–Aug.

+– +– Perigynia broadest near the middle.

+– Perigynia 2 to 3 mm. long, fully half as broad.

= Plant glaucous: spikelets oblong-cylindric to ovoid; the strongly appressed-ascending pale perigynia slightly roughened or smooth above, tapering gradually to the short obscure beak.

31. C. CANESCENS, L. — Figs. 114, 115. — *Culms soft, in loose stools,* 1.5 to 6 dm. high: *leaves soft and flat,* shorter than or exceeding the culms, *2 to 4 mm. broad: spike 2.5 to 5 cm. long,* of 4 to 7 oblong-cylindric to narrowly obovoid *appressed-ascending approximate* or slightly remote *spikelets 0.6 to 1 cm. long, the lowermost rarely 1.5 cm. apart: perigynia glaucous,* ovoid-oblong, usually serrulate toward the short-pointed tip, *2.3 to 3 mm. long, 1.3 to 1.7 mm. broad,* more or less nerved on both faces, somewhat exceeding the ovate pointed scale. Sp. ii. 974; Oeder, Fl. Dan. ii. 8, t. 285; Lightf. Fl. Scot. ii. 550; Reichb. Ic. Fl. Germ. viii. 7, t. 206, fig. 546; Anders. Cyp. Scand. 57, t. 4, fig. 39; Boott, Ill. iv. 154, in part; W. Boott ex Rothrock in Wheeler, Rep. 277; Ett. & Pok. Phys. Pl. Aust. vi. t. 515; Richter, Pl. Eu. i. 151. *C. brizoides,* Huds. Fl. Ang. 349, not L. *C. elongata,* Leers, Fl. Herb. 197, t. 14, fig. 7; Olney ex Wats. Bot. King Rep. 365; Bailey in Coulter, Man. Rocky Mt. Reg. 394, in part; not L. *C. cinerea,* Pollich, Pl. Palat. ii. 571. *C. Richardi,* Thuill. Fl. Par. (1799) 482. *C. curta,* Good. Trans. Linn. Soc. ii. 145; Host, Gram. i. 37, t. 48; Schkuhr, Handb. iii. 347, t. 287C, fig. 13; Eng. Bot. xx. t. 1386; Kunth, Enum. ii. 403. *C. lagopina,* Olney ex Wats. Bot. King Rep. 365, in part, not Wahl. *C. canescens,* var. *dubia,* Bailey, Bot. Gaz. ix. 119 & Proc. Am. Acad. xxii. 143. *C. canescens,* var. *robustina,* Macoun, l. c. 376. — Northern EUROPE. In wet places, seen from the following American stations — LABRADOR, (*Spreadborough* hb. Geol. Surv. Can. no. 13,372): RUPERT LAND, Lake Mistassini (*J. M. Macoun,* hb. Geol. Surv. Can. no. 30,511): MAINE, Fort Kent, Island Falls, and Foxcroft (*M. L. Fernald,* nos. 2143, 2144, 2145): NEW HAMPSHIRE, Mt. Washington and Mt. Lafayette (*E. & C. E. Faxon*); Crawfords (*E. F. Williams*): VERMONT, Ripton (*Ezra Brainerd*): ONTARIO, Belleville & Lake Nipigon (J. Macoun, hb. Geol. Surv. Can. nos. 30,513, & 30,512): MICHIGAN, Alma (*C. A. Davis*): COLORADO, Twin Lakes (*J. Wolff,* no. 1017); Bob Creek, alt. 3,230 m. (*Baker, Earle & Tracy,* no. 693): MONTANA, Grasshopper Valley (*S. Watson,* no. 435): WYOMING, without station (*Parry,* no. 278); Centennial Hills (*A. Nelson,* no. 1730); Beaver Lake (*A. & E. Nelson,* no. 6130):

Utah, Bear River Cañon, alt. 3,080 m. (*S. Watson*, nos. 1231[a] & 1233); Alta, Wahsatch Mts., alt. 2,460 m. (*M. E. Jones*, no. 1273): Alaska, Ounalaska (*J. M. Macoun*, hb. Geol. Surv. Can., no. 30,514); Sitka (*Mertens*): Alberta, Lake Louise (*E. Brainerd*): British Columbia, Revelstoke (nos. 19 & 30,526), Comox (no. 371), Port Henly (no. 20,500), Mt. Mark, Vancouver Isl. (no. 30,515), Beaver Creek, Selkirk Mts. (no. 30,519), Dead Man River (no. 30,522), — *John Macoun*, hb. Geol. Surv. Can.; Ilgacho Brook (*Dawson*, hb. Geol. Surv. Can. no. 30,518); Lulu Island, Fraser River Delta (*R. B. Dixon*): Washington, upper valley of the Nesqually (*O. D. Allen*, no. 163). May–Aug.

Var. subloliacea, Laestad. — Figs. 116, 117. — Smaller, the short-oblong or subglobose *spikelets 4 to 7 mm. long: perigynia* smaller, *barely 2 mm. long*, smooth throughout. — Nov. Act. Soc. Sci. Ups. xi. 282; Andersson, Cyp. Scand. 57; Boott, l. c.; Bailey, Mem. Torr. Cl. i. 66; Richter, l. c. 152. *C. lapponica*, Lange, Linnaea, xxiv. 539. *C. canescens* in part, of Am. authors. — Lapland. In America specimens examined from Ungava, Ungava Bay (*L. M. Turner*): Hudson Bay (*Sir John Richardson*): New Brunswick, South Tobique Lakes (*G. U. Hay*, no. 55); Petitcodiac (*J. Brittain*, hb. Geol. Surv. Can. no. 30,510): Nova Scotia, Halifax (*J. Macoun*): Maine, Orono and Southport (*M. L. Fernald*): New Hampshire, Mt. Washington (*Asa Gray*, et al.); Mt. Monadnock — ledges toward summit (*W. P. Rich*): Vermont, Willoughby Lake (*W. Boott, G. G. Kennedy*); summit of Mt. Mansfield (*E. Brainerd*); bog, Wallingford, alt. 675 m. (*E. Brainerd*): Massachusetts, Sharon (*W. P. Rich*); Washington, Berkshire Co. (*W. Boott*): New York, Fairfield (*A. Gray*); Pen Yan (*Sartwell*, no. 32); Oriskany Swamp (*Kniesken*); tamarack swamps, Herkimer Co. (*J. V. Haberer*): Ontario, Ottawa (*J. Fletcher*, hb. Geol. Surv. Can., no. 7408); Hastings Co. (*J. Macoun*): Michigan, Flint (*D. Clark*); Lansing (*L. H. Bailey*, no. 262); Alma (*C. A. Davis*): British Columbia, Mts. east of Adams Lake (*Dawson*, hb. Geol. Surv. Can., no. 30,520): Washington, Seattle (*C. V. Piper*, no. 1106).

Var. **disjuncta**. — Figs. 118 to 120. — Tall and lax, 3 to 8 dm. high: *spike elongated, flexuous, 0.5 to 1.5 dm. long;* the 5 to 8 oblong-ovoid to cylindric *spikelets 6 to 12 mm. long, all but the terminal remote, the lowermost 2 to 4 cm. apart:* perigynia as in the species, serrulate above. — *C. canescens* of most Am. authors. *C. canescens*, form, Boott, Ill. iv. 154, t. 496. The common form in eastern America found in

most swamps or on wet shores from NEWFOUNDLAND to MICHIGAN, OHIO and PENNSYLVANIA. The following numbered specimens belong here — PRINCE EDWARD ISLAND, Brackley Point (*J. Macoun*, hb. Geol. Surv. Can. no. 30,509): NEW BRUNSWICK, Serpentine River (*Hay*, no. 84); Chipman (*Wetmore*, hb. Geol. Surv. Can. no. 30,507): NOVA SCOTIA, Boylston (*C. A. Hamilton*, hb. Geol. Surv. Can., no. 25,443); Baddeck (no. 20,805), Sable Island (nos. 22,076 & 23,071), Truro (no. 30,506) — *J. Macoun*, hb. Geol. Surv. Can.: MASSACHUSETTS: Framingham (*E. C. Smith*, no. 628): CONNECTICUT, Southington (*L. Andrews*, no. 590): ONTARIO, Cache Lake (*J. Macoun*, hb. Geol. Surv. Can., no. 22,036).

= = Green, not glaucous: spikelets subglobose to short-oblong, few-flowered: the loosely spreading dark green or brown perigynia serrulate at the base of the distinct beak.

32. C. BRUNNESCENS, Poir. — Figs. 121 to 124. — *Very slender* and lax: culms 1.5 to 7 dm. high: *leaves soft, flat, 1 to 2.5 mm. wide*, shorter than or equalling the culms: *spike 1 to 6 cm. long*, of 3 to 6 more or less remote or approximate *spikelets 3 to 7 mm. long: perigynia* 2 to 2.7 mm. long, 1 to 1.5 mm. broad, *with distinct slender beaks, loosely spreading when mature.* — Suppl. iii. 286; Britton, l. c. 351, fig. 848. *C. curta*, var. *brunnescens*, Pers. Syn. ii. 539. *C. canescens*, var. *alpicola*, Wahlenb. Fl. Lapp. 232; Bailey, Proc. Am. Acad. xxii. 143, & in Gray, Man. ed. 6, 618; Macoun, l. c. 124; Howe, l. c. 37. *C. Gebhardii*, Hoppe Car. Germ. 30. *Vignea Gebhardi*, Reichb. Fl. Exc. 58. *C. canescens*, β, Torr. Ann. Lyc. N. Y. iii. 393. *C. Persoonii*, Lange, Flora, xxv. (1842), 748; Reichb. Ic. Fl. Germ. viii. 7, t. 206, fig. 547. *C. canescens*, var. *sphaerostachya*, Tuck. Enum. Meth. 10, 19; Carey in Gray, Man. 544. *C. vitilis*, Fries, Mant. iii. 137; Anders. Cyp. Scand. 58, t. 4, fig. 38; Boott, Ill. iv. 219; Fl. Dan. xvii. t. 2973. *C. Buckleyi*, Dewey, Am. Jour. Sci. xlviii. 143, t. Dd, fig. 104. *C. sphaerostachya*, Dewey, l. c. xlix. 44, t. Ee, fig. 110. *C. canescens*, var. *vitilis*, Carey in Gray, Man. ed. 2, 514. *C. canescens*, var. *brunnescens*, Boott, l. c. 220 (*nomen nudum*); Bailey. Mem. Torr. Cl. v. 74. *C. canescens*, var. *vulgaris*, Bailey, Bot. Gaz. xiii. 86, Mem. Torr. Cl. i. 66, v. 74, & in Gray, Man. ed. 6, 618; Macoun, l. c. 123; Howe, l. c. 37. *C. brunnescens*, var. *gracilior*, Britton, l. c. 350. — Open woods and dry, rocky banks, NEWFOUNDLAND and LABRADOR to BRITISH COLUMBIA, south to IDAHO, MICHIGAN, and mostly in the mountains to NORTH CAROLINA. Also in GREENLAND and northern

EUROPE. June–Aug. On alpine summits becoming more rigid and browner than in sheltered situations.

++ ++ Perigynia 4 to 5.5 mm. long, distinctly less than half as broad.

= Leaves very narrow (1 to 2.5 mm. broad): spikelets lanceolate: perigynia 1 to 1.3 mm. wide.

33. C. BROMOIDES, Schkuhr. — Figs. 125, 126. — *Very slender* and lax, *green*, scarcely glaucous, the culms 3 to 8 dm. long, mostly exceeding the soft flat leaves: *spike loosely subcylindric*, 2 to 5.5 cm. long, *of 2 to 6 approximate or slightly scattered spikelets 0.5 to 2 cm. long:* beak of the *perigynium* one-half to two-thirds as long as the *strongly nerved* body, slightly exceeding the *oblong pointed scale.* — Riedgr. Nachtrag. 8, t. Xxx, fig. 176; Willd. Sp. iv. 258; Schwein. & Torr. Ann. Lyc. N. Y. i. 300; Torr. l. c. 391; Carey in Gray, Man. 539; Chapm. Fl. 533; Boott, l. c. ii. 82, t. 227; Bailey, Proc. Am. Acad. xxii. 146; Macoun, l. c. 114; Britton, l. c. 354, fig. 857; Howe, l. c. 47. — Rich low woods and swamps, NOVA SCOTIA, southern NEW BRUNSWICK and central MAINE to western ONTARIO and MICHIGAN, south to FLORIDA and LOUISIANA.[1] May–July.

= = Leaves broader (2 to 5 mm. broad): spikelets ovoid: perigynia 1.6 to 1.9 mm. wide.

34. C. DEWEYANA, Schweinitz. — Figs. 127, 128. — Very lax, *glaucous*, the culms 2 to 12 dm. long, much exceeding the soft, flat leaves: *spike flexuous*, 2 to 6 cm. long, *of 2 to 5* (in very luxuriant individuals rarely 6 or 7) *3- to 12-flowered spikelets 5 to 12 mm. long*, the upper subapproximate or scattered, *the lowest very remote, usually subtended by an elongate slender bract:* beak about one-half as long as the *obscurely nerved or nerveless body of the perigynium*, somewhat exceeding the *ovate acuminate or short-cuspidate* pale *scale.* — Ann. Lyc. N. Y. i. 65; Dewey, Am. Jour. Sci. ix. 62, t. 3, fig. 11; Schwein. & Torr. l. c. 310; Torr. l. c. 392; Carey, l. c. 544; Boott, l. c. i. 27, t. 70; W. Boott in Wats. Bot. Calif. ii. 236; Bailey in Coulter, Man. Rocky Mt. Reg. 394, & Proc. Am. Acad. xxii. 146; Macoun, l. c. 124; Britton, l. c. fig. 856; Howe, l. c. 36. *C. remota*, Richards. in Frankl. 1st Journ. ed. 2, App. 35, acc. to Boott, not L. — Rich open woods and banks, NOVA SCOTIA and

[1] Californian and other northwestern specimens referred here seem much better placed with the stouter broader-leaved *C. Bolanderi*, Olney.

QUEBEC to ATHABASCA and BRITISH COLUMBIA, south to PENNSYLVANIA, MICHIGAN, NEW MEXICO, and WASHINGTON.[1] May–Aug.

* * Perigynia entirely smooth at the tip (exceptional forms of *C. canescens* might be looked for here; and very rare individuals of *C tenuiflora* might be sought in the preceding section).

+ Perigynia oblong or ovate-oblong.

++ Perigynia 3 to 4 mm. long, nerved: culms weak, almost capillary: spikelets 2 to 4, loose, silvery-green or silvery brown.

= Spikelets closely approximate in a small usually bractless terminal cluster: perigynia beakless.

35. C. TENUIFLORA, Wahlenb. — Figs. 129, 130. — Lax, the culms 2 to 6 dm. long, mostly exceeding the very narrow (0.7 to 2 mm. broad) pale green leaves: *spikelets subglobose, 3- to 10-flowered: perigynia 3 to 3.4 mm. long,* 1.5 to 1.7 mm. broad, with the bluntish scarcely beaked tip smooth or rarely with one or two teeth, about equalled by the ovate or ovate-oblong white scale. — Kongl. Vet. Acad. Handl. xxiv. 147, & Fl. Lapp. 232; Schkuhr, Riedgr. Nachtr. 17, t. Eeee, fig. 187; Anders. Cyp. Scand. 59, t. 4, fig. 36; Hook. Fl. Bor.-Am. ii. 214; Torr. l. c. 392, 443; Carey, l. c. 543; Boott, Ill. iv. 144, t. 463; Fl. Dan. Suppl. 13, t. 167; Bailey, Proc. Am. Acad. xxii. 145; Macoun, l. c. 122; Britton, l. c. 352, fig. 851 (as to habital drawing); Howe, l. c. — Cold bogs among the mountains, SCANDINAVIA. Bogs and wet mossy woods, local, from eastern UNGAVA to western KEEWATIN and MANITOBA; south to Westmoreland and Victoria Cos., NEW BRUNSWICK; southern Aroostook, Penobscot and Oxford Cos., MAINE; Hampshire Co., MASSACHUSETTS; Oneida Co., NEW YORK; Ingham Co., MICHIGAN; Milwaukee Co., WISCONSIN; Chisago and Hennepin Cos., MINNESOTA: also on Elbow River, ALBERTA, and near Victoria, BRITISH COLUMBIA (*Macoun*, hb. Geol. Surv. Can. nos. 25,571 & 30,517).

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[1] The California material which has been referred here is *C. Bolanderi*, Olney, differing in its less acutely angled culm, longer spikes of more approximate usually more numerous lance-cylindric many-flowered spikelets, the lowest with or without a short bract. The northwestern *C. Bolanderi*, var. *sparsiflora*, Olney (*C. Deweyana*, var. *sparsiflora*, Bailey) is a distinct species, probably *C. laeviculmis*, Meinshausen, Acta Hort. Petrop. xviii. 326, in its small short-beaked strongly nerved finally spreading thin-edged perigynia much nearer related to the eastern *C. seorsa* than to the members of the *Elongatae*.

= = Spikelets remote, the uppermost strongly divaricate-pedunculate; the lowermost subtended by a long leaf-like bract: perigynia beaked.

36. C. TRISPERMA, Dewey. — Figs. 131, 132. — Culms almost filiform, 2 to 7 dm. long, usually much overtopping the soft narrow (0.5 to 2 mm. wide) leaves: *the 2 or 3 spikelets, 2- to 5-flowered:* the finely many-nerved *perigynia 3.3 to 3.8 mm. long,* 1.6 to 1.8 mm. broad, slightly exceeding the ovate-oblong pale obtuse to mucronate-acuminate scale. — Am. Jour. Sci. ix. 63, t. 3, fig. 12; Hook. Fl. Bor.-Am. ii. 213; Schwein. & Torr. l. c. 311; Carey, l. c. 543; Boott, l. c. i. 29, t. 74; Bailey, Proc. Am. Acad. xxii. 144; Macoun, l. c. 122; Britton, l. c. 353, fig. 855; Howe, l. c. 35. — Mossy woods and bogs, NEWFOUNDLAND and LABRADOR to SASKATCHEWAN, south to northern PENNSYLVANIA, OHIO, MICHIGAN, and NEBRASKA (according to Webber), and in the mountains to Garrett Co., MARYLAND. Ascending to 770 m. in the New England mountains. June–Aug.

+ + Perigynia 1.2 to 1.5 mm. long, nerveless, with a very short broad truncate beak, or beakless: culms wiry: spikelets 3 to 5, closely flowered, in a greenish-brown or straw-colored linear spike.

37. C. elachycarpa. — Figs. 133, 134. — Tufted, the *stiff slender culms* 3 or 4 dm. high, *strongly scabrous above,* longer than the soft narrow (1 to 2 mm. broad) green leaves: *spike 0.5 to 1.5 cm. long; the appressed ascending narrowly ovoid approximate or slightly remote spikelets 3 to 6 mm. long: perigynia oblong, plump, smooth and nerveless, subtruncate at base, shorter than the* oblong-ovate acuminate *dull-brown, green-ribbed scales.* —MAINE, wet sandy river bank, Fort Fairfield, June 29, 1899 (*M. P. Cook, E. L. Shaw & M. L. Fernald*). A unique plant, in maturity strongly suggesting an immature slender form of *C. echinata,* or the little-known *C. helvola,* Blytt, which, however, have very different perigynia.

+ + Perigynia broadly elliptic to suborbicular: spikes mostly tinged with brown.

+ + Terminal spikelet with conspicuous clavate sterile base: perigynia rather abruptly contracted to the slender beak.

= Spikelets mostly distinct, the lowest 4 or 5 mm. thick.

38. C. NORVEGICA, WILLD. — Figs. 135, 136. — *Glaucous* and *freely stoloniferous; culms smooth and soft,* 1 to 4.5 dm. high, mostly overtopping the soft flat rather narrow (1 to 2.5 mm. broad) leaves: spike

1.5 to 5.5 cm. long, of *2 to 6 ovoid or broad-oblong spikelets; the lower 5 to 12 mm. long, the terminal*, including the clavate sterile base, *1 to 1.8 cm. long: perigynia* pale, faintly nerved, 2.5 to 3.3 mm. long, 1.6 to 2 mm. broad, *conic-rostrate*, usually abruptly contracted to a substipitate base, about equalled by the *yellowish brown orbicular to ovate blunt scales.* — Willd. ex. Schkuhr, Riedgr. 50, t. S, no. 66, & Spec. iv. 227; Wahlenb. Kongl. Vet. Acad. Handl. xxiv. 146, & Fl. Lapp. 233, t. 15, fig. 3; Anders. Cyp. Scand. 61, t. 4, fig. 29; Goodale in Holmes, Prelim. Rep. Nat. Hist. & Geol. Me. (1861), 128, & Proc. Portland Soc. Nat. Hist. i. 135; Gray, Man. ed. 3, Addend. xcvii: Boott, l. c. iv. 214; Fl. Dan. Suppl. 13, t. 103; Bailey, Proc. Am. Acad. xxii. 145; Macoun, l. c. 125; Britton, l. c. 351, fig. 849 (as to habital sketch). — Brackish marshes, northern SCANDINAVIA. Damp usually brackish soil, coast of southern LABRADOR: Anticosti Island, and Kamouraska, Saguenay, Rimouski, and Gaspé Cos., QUEBEC: locally southward along the coast in NEW BRUNSWICK at Shediac, Westmoreland Co., and Back Bay, Charlotte Co. (*J. Brittain*, herb. Geol. Surv. Can. nos. 30,421 & 30,420); Whale Cove, Grand Manan and Fryes Island (*Hay*): NOVA SCOTIA, Baddeck, Cape Breton and Truro (*J. Macoun*, herb. Geol. Surv. Can. nos. 20,846 & 30,422); Boylston (*C. A. Hamilton*, herb. Geol. Surv. Can. no. 25,521): MAINE, Little Cranberry Isle (*Redfield*); Wells (*Blake*): reported from Alaska.[1] June–Aug.

= = Spikelets approximate at the tip of the culm, the lowest 2.5 to 4 mm. thick.

a. Plant weak and lax, with filiform or involute leaves.

39. C. GLAREOSA, Wahlenb. — Figs. 137, 138. — *Culms acutely angled, mostly curved*, scabrous at tip, 1 to 3 dm. high, once and a half or twice exceeding the *flaccid narrow (0.5 to 1.5 mm. broad) leaves:* spike oblong to obovoid, 0.7 to 2 cm. long, *with 2 to 4 appressed-ascending obovoid spikelets; the lower 4 to 9 mm. long, 3 or 4 mm. thick, the terminal* larger, including the slender sterile base, *6 to 11 mm. long: perigynia pale*, elliptic or ovate, acute at base, *with narrowly conic beak*, faintly nerved or nerveless, 2.5 to 3 mm. long, 1.1 to 1.9 mm. broad, nearly or quite equalled by the *ferrugineous white-edged ovate acutish scales.* — Kongl. Vet. Acad. Handl. xxiv. 146, & Fl. Lapp. 230; Willd.

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[1] Prof. Conway MacMillan has courteously forwarded me the Minnesota specimens referred to *C. norvegica* by Mr. E. P. Sheldon (Bull. Torr. Cl. xx. 284, & Minn. Bot. Studies, i. 224), and they prove to be *C. interior*, Bailey.

Spec. iv. 251; Schkuhr, Riedgr. Nachtr. 24, t. Aaa, fig. 97; Anders. l. c. 62, t. 4, fig. 31; Torr. l. c. 396; Dewey, Am. Jour. Sci. Ser. 2, iv. 344; Boott, l. c. 153, t. 494; Fl. Dan. xiv. 8, t. 2430; Bailey, Proc. Am. Acad. xxii. 146; Macoun, l. c. 127; Britton, l. c. 353, fig. 854; Meinshausen, Acta Hort. Petrop. xviii. 325. — Arctic regions of both hemispheres, extending south in America along the coast of LABRADOR to QUEBEC, Bonne Esperance (*Allen*), Watsheeshoo (*St. Cyr*, hb. Geol. Surv. Can. no. 16,524), and Tadousac (*Kennedy*), Saguenay Co.; Pointe des Monts (*Bell*) and Grand Etang (*Macoun*, hb. Geol. Surv. Can. no. 30,413), Gaspé Co.: also on the coast of ALASKA. June–Aug.

b. **Plant stiff and upright, with flat leaves.**

40. C. LAGOPINA, Wahlenb. — Figs. 139, 140. — *Culms obtusely angled, mostly erect*, smooth except at tip, 1 to 4 dm. high, more or less exceeding the *narrow* (*1 to 3 mm. wide*) *leaves:* spike from cylindric to globose, 1 to 2.5 cm. long, with *3 to 6 ascending spikelets mostly larger than in the last: perigynia brown or reddish-brown*, from elliptic-lanceolate to broadly obovate, *rather abruptly beaked*, 2.5 to 3.8 mm. long, 1.5 to 1.9 mm. wide, exceeding the *ovate obtuse white-margined fuscous scales.* — Kongl. Vet. Acad. Handl. xxiv. 145, & Fl. Lapp. 229; Gay, Ann. Sci. Nat. Ser. 2, xi. 177; Drejer, Rev. 25; Anders. l. c. 63, t. 4, fig. 28; Reichenb. l. c. t. 204, fig. 543; Torr. l. c. 393; Boott, Ill. iv. 189; W. Boott in Wats. Bot. Calif. ii. 233; Bailey in Coulter, Man. Rocky Mt. Reg. 395, & Proc. Am. Acad. xxii. 145; Britton, l. c. 353, (fig. uncharacteristic); Meinsh. l. c. *C. leporina*, L. Spec. 973, in part (cit. Fl. Lapp.); Oeder, Fl. Dan. ii. 9, t. 294; Willd. Spec. iv. 229; Schkuhr, Riedgr. Nachtr. 17, in part (excl. t. Fff, fig. 129); Host, Gram. iv, 45, t. 80; Eng. Bot. Supp. iii. t. 2815. *C. Lachenalii*, Schkuhr, Riedgr. 51, t. Y. fig. 79. *C. approximata*, Hoppe, ex DC. Fl. Fr. vi. 290. *C. parviflora*, Gaud. Etr. Fl. 84, acc. to Boott. *C. furva*, Webb, Iter Hisp. 5. — Arctic and alpine regions of EUROPE and ASIA: GREENLAND: ARCTIC AMERICA, rarely south to Mt. Albert, Gaspé Co., QUEBEC, the mountains of COLORADO, and northern CALIFORNIA. June–Aug.

†† †† Terminal spikelet ovoid or subglobose, not conspicuously clavate at base: perigynia tapering gradually to the tip: culms sharply angled and harsh, upright, the 2 to 5 spikelets crowded at the tip: leaves flat.

41. C. HELEONASTES, Ehrh. — Figs. 141, 142. — *Culms* 1.5 to 3.5 cm. high, *stiff*, usually overtopping the *erect narrow* (*1 or 2 mm. wide*)

leares: the *globose or ovoid spikelets 4 to 8 mm. long: perigynia* 2.5 to 3.5 mm. long, 1.2 to 1.7 mm. broad, *brown tinged*, mostly exceeding the *ovate blunt scales.* — Ehrh. in L. f. Suppl. 414; Wahlenb. Kongl. Vet. Acad. Handl. xxiv. 146, & Fl. Lapp. 230; Schkuhr, Riedgr. 51, t. Ii, fig. 97; Hoppe & Sturm, Car. Germ. t. 6; Hook. Fl. Bor.-Am. ii. 214; Reichenb. Ic. Fl. Germ. viii. t. 204, fig. 542; Anders. Cyp. Scand. 62, t. 4, fig. 30; Boott, Ill. iv. 152, t. 489; Fl. Dan. Suppl. t. 31; Bailey, Proc. Am. Acad. xxii. 145; Macoun, l. c. 127; Britton, l. c. 352, fig. 852. *C. leporina*, Schkuhr, Riedgr. Nacht. t. Fff, fig. 129, not L. *C. Carltonia*, Dewey, Am. Jour. Sci. xxvii. 238, t. U. fig. 64; Torr. l. c. 393. *C. marina*, Dewey, l. c. xxix. 247, t. X, fig. 74; Torr. l. c. — Bogs and mossy places, arctic and alpine EUROPE. Very locally in America: examined from the following stations: — KEEWATIN, York Factory (*Sir John Richardson*): SASKATCHEWAN, Norway House and Carlton House (*Richardson*): ALBERTA, Lake Louise (*Ezra Brainerd*, no. 172): BRITISH COLUMBIA, Glacier (*Ezra Brainerd*); Kicking Horse Lake (*J. Macoun*, hb. Geol. Surv. Can. nos. 28; 49; 30,410; 30,411; 30,412). July, Aug.

II. — THE VARIATIONS OF SOME BOREAL CARICES.

CAREX AQUATILIS.

C. AQUATILIS, Wahlenb., Kongl. Acad. Handl. xxiv. 165. — Plants 3 to 9 dm. high; leaves 4 to 7 mm. broad: spikelets [1] slender; the pistillate 1.5 to 5.5 cm. long, 3 to 4.5 mm. thick, the lowermost often long-attenuated and remotely flowered at base: scales dark, subacute, hardly equalling or barely exceeding the perigynia. — Northern EUROPE, GREENLAND. In North America from the Shickshock Mts., Gaspé, QUEBEC,

[1] The inflorescences of *Carex* are simple or compound spikes, racemes, or panicles; and, since in other genera of *Cyperaceae*, as *Cyperus* and *Scirpus*, the ultimate spicate divisions of the inflorescence are called *spikelets*, that term is here adopted, for the sake of uniformity and clearness, for these ultimate spicate divisions of the inflorescence of *Carex*. The species in which there is a solitary simple inflorescence (or true spike), as *C. gynocrates* and *C. exilis*, are few in comparison with those in which the inflorescence has more than one such division. From the occurrence in those plants, however, of occasional secondary divisions of the inflorescence, the term *spikelet* seems not inappropriate to the normal inflorescence of such species.

to Bear Lake, Mackenzie & British Columbia, south to Maine, Vermont, central and western New York, and Utah. The Scandinavian material examined has been referred to the true *C. aquatilis* by Andersson, Fries, Laestadius, and Wickström, and it agrees well with Lange's representation of the plant in Flora Danica, Supplement, t. 33. This is the plant of broadest range in America. Many extreme variations have been described by European authors. The identity of these is too often obscure, but some of the forms recognized by Mr. Arthur Bennett in Great Britain (Jour. Bot. xxxv. 248) are found to occur also in America. As extreme variations these plants may well be distinguished, though many transitional specimens occur which render their ready separation difficult. The best marked forms are the following:

Var. elatior, Bab. Man. Brit. Bot. 341; Bennett, l. c. 249. — Robust, 0.9 to 1.5 m. high: leaves 5 to 8 mm. broad: pistillate spikelets stout and heavy, 3.5 to 8 cm. long, 5 to 8 mm. thick: scales dark, blunt or acuminate, about equalling or slightly exceeding the perigynia. — Maine, Fort Fairfield and Orono (*M. L. Fernald*, nos. 136, in part, 395): New York, Pen Yan & Junius (*Sartwell*); Dexter (*G. Vasey*); Jefferson Co. (*Crawe*); Niagara Falls (*W. Boott*): Ohio (*Sullivant*): Michigan, Pêche Isle, Detroit River (*C. F. Wheeler*): Manitoba, English River (*Sir John Richardson*).[1] I have been unable to see authentic specimens of Babington's plant, but from his description and the note of Mr. Bennett, it seems probable that our large form should be referred there. The material from Orono (where the once abundant plant has been exterminated by the "improvement" of the meadow) has been described as a hybrid, *C. aquatilis* × *stricta*, Bailey, Bot. Gaz. xvii. 153; but there was little besides the local occurrence of the plant to suggest hybrid origin. The same very large form is shown in Crawe's New York material, as well as in Richardson's English River plant, and it is closely matched by Boott's plate 542, drawn from New York specimens.

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[1] Richardson's plant probably came from the river rising in Lake Sal and flowing into Lake Winnipeg from the southeast. The name *English River* has been applied to a district between the Saskatchewan and Athabasca Lake, and it was long used for the upper portion of Churchill River (emptying into Hudson Bay). This larger northern river, however, was consistently spoken of by Richardson in his Arctic Searching Expedition (1852), p. 62, &c., as Missinippi or Churchill River, while to the more southern river flowing from Lake Sal he applied the name English River (p. 362).

Var. VIRESCENS, Anders. Cyp. Scand. 46; Bennett, l. c. — Scales pale and short, mostly hidden by the closely imbricated perigynia, thus giving the spikelets a pale green color. — Northern EUROPE. The only American specimens seen are from MICHIGAN, without locality (*Michigan State Collection* in herb. Gray); near Alma (*C. A. Davis*). Material from Pownal, VERMONT, closely approaches this variety, but has longer darker scales.

Var. CUSPIDATA, Laest. ex Fries, Bot. Not. (1843) 104; Bennett, l. c. — Spikelets slender, 3 or 4 mm. thick: scales cuspidate, distinctly exceeding the perigynia. — Northern EUROPE. QUEBEC, Grand Etang, Gaspé (*J. Macoun*): NEW JERSEY, Camden (*C. F. Parker*). The Gaspé plant is a perfect match for Lapland material from Nylander, but the New Jersey specimen shows a nearer approach to typical *C. aquatilis*.

Var. EPIGEJOS, Laest. Kongl. Vet. Akad. Handl. (1822) 339; Bennett, l. c. — Very slender: the leaves 2 to 3.5 mm. broad: spikelets at most 5 cm. long, 2 to 4.5 mm. thick; scales dark and blunt. — Northern EUROPE, GREENLAND. NEWFOUNDLAND (*La Pylaie*); Packs Harbor (*A. C. Waghorne*, no. 35): LABRADOR, L'Anse au Loup (*J. A. Allen*): QUEBEC, Mont Louis, Cape Rosier, and Madaline River, Gaspé (*J. Macoun*, nos. 23, 27, 31). The material examined matches well Scandinavian material from Ahlberg. It is also identical with plants from Lapland distributed by Andersson as var. *sphagnophila*. The latter variety, however, is said by Andersson to differ from var. *epigejos* in its pale not dark scales.

CAREX PILULIFERA and C. COMMUNIS.

Carex pilulifera, L., a common species of Europe, presents three rather marked tendencies. The original plant of Linnaeus was apparently the common form with the pistillate spikelets subapproximate or slightly remote at the tip of the somewhat curved culm. This form with the lower spikelets sometimes 1 cm. apart, is represented in the Gray Herbarium by specimens from many parts of northern and central Europe. In this plant the perigynium is 2.5 to 3.5 mm. long, tipped by a short bidentate beak less than 1 mm. in length. Another phase of the plant, evidently rare in Europe, has larger more scattered spikelets, the lower often subtended by a conspicuous leafy bract; and the larger perigynia more ellipsoid or with the longer beak equalling the stipitate spongy basal portion and thus giving the perigynia a symmetrical spindle-

form. This larger plant was described by Lange as var. *longibracteata* and later figured by him in Flora Danica, xvii. t. 3050; and again it has been described by Ridley and figured in Jour. Bot. xix. 97, t. 218, as var. *Leesii*. A third European form, var. *pallida*, Peterm., as shown by Reichb. Ic. Fl. Germ. viii. 26, t. 240, has the densely flowered spikelets closely approximate in an ovoid or subglobose head.

In studying this European species in connection with the well known American plant which has recently been called *C. communis*, Bailey, the writer has been baffled in every attempt to find constant distinguishing characters to separate the plants of the two continents. The form of the plant most common perhaps in America is apparently rare in Europe (var. *longibracteata*, Lange; var. *Leesii*, Ridley), but it passes by absolutely promiscuous variations into a small form which can be distinguished in none of its characters from the smaller tendency of the European *C. pilulifera*.

By early caricologists the American plant was supposed to be *Carex varia*, Muhl., and under that name it passed until in 1889 Professor Bailey showed that Muhlenberg's plant was the more slender species described by Dewey as *C. Emmonsii*. In place of the misapplied name, *C. varia*, Professor Bailey proposed for the plant which had long borne that name the new appellation *C. communis*, giving no suggestion that the plant has close affinity to the common *C. pilulifera* of Europe. To earlier students, however, the separation of the American and European plants of this group had presented many perplexities. Drejer stated in his Revisio that he could find no distinctions either in the descriptions or specimens: "Forsitan nostra planta rectius cum *C. varia* Mühlenb. conjungitur; quo modo autem *C. variam* a *C. pilulifera* distinguam, neque ex descriptione neque ex speciminibus eruere possum."[1] Schlechtendahl discussing specimens in the Willdenow herbarium which he took for *C. varia* was unable to point out any character to separate it from *C. pilulifera*: "Species haec vero simillima *C. pululiferae* et uti nobis fere videtur eadem."[2] Whether Drejer and Schlechtendahl had true *C. varia* of Muhlenberg or the coarser plant which so long passed under that name is not perfectly clear, although it is probable that Schlechtendahl at least had the true *C. varia*.[3] This plant, the true *C. varia* (*C. Emmonsii*, Dewey) is readily distinguished from *C. pilulifera* by its much more slender habit, very narrow leaves and smaller-bodied longer-beaked perigynia.

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[1] Drejer, Rev. Crit., 55.

[2] Linnæa, X. 262.

[3] See Bailey, Mem. Torr. Club., I. 40.

The coarse American plant, *C. communis*, Bailey, which until recently passed as *C. varia*, presents, however, less definite marks of specific distinctness. The most careful analysis of the characters which are supposed to separate *C. communis* (*C. varia* of authors) from *C. pilulifera* was published by Francis Boott, who inclined to regard the two species as separable. In his discussion of *C. pilulifera*, Boott said: "A *C. varia*, Muhl. [*C. communis*, Bailey], differt spicis confertis, plurifloris, subinde apice masculis, e viridi-purpureo variegatis; perigyniis enerviis, rostello semper recto breviore bidentato; basi styli persistente abrupte compresso-deflexa; culmo incurvo, basi vaginis foliorum pallide ferrugineis tecto; foliis viridibus."[1] In discussing *C. varia* [*C. communis*, Bailey] he said: "A *C. pilulifera* differt inflorescentia laxa; spicis plus minus remotis, laxifloris, saepe paucifloris; perigyniis subinde nervatis, rostro nunc excurvato, bifido; basi styli persistente recta; vaginis foliorum purpureis."[2]

When we analyze these supposed differences in the light of old specimens and the abundant modern ones which have accumulated since the publication of Dr. Boott's work, certain traditional marks of separation fail. The large form of the American plant figured by Boott (t. 288) as *C. varia*, and treated by Bailey as *C. communis* and by Britton as *C. pedicellata*, has the spikelets more remote than in the common European form of *C. pilulifera*; but a comparison of this plate with Lange's illustration of his *C. pilulifera*, var. *longibracteata* (Fl. Dan. xvii. t. 3050) and the figure of *C. pilulifera*, var. *Leesii* (Jour. Bot. xix. t. 218), shows that the rarest form of the European plant is not to be distinguished by the crowding of the spikelets from our larger form of C. *communis*. If, furthermore, we compare Boott's *C. varia*, var. *minor* (t. 289), a common plant in America, with the smaller European specimens of *C. pilulifera* with slightly remote spikelets, no constant difference can be found to separate them. The plant in America passes by innumerable transitions to the coarsest form (var. *longibracteata*), as shown in the large middle specimen in Boott's t. 289, but in its extreme form, as shown by the smaller specimens in that plate, the spikelets are often subapproximate. A comparison of this plate as well as scores of American specimens such as Eggleston's no. 434 from Middlebury, Vermont; Brainerd's material from Mt. Mosalamoo, Vermont; no. 4897b of the Biltmore Exsiccatae from Craggy Mt., North Carolina; Bailey's material of June 13, 1888, from West Harrisville, Michigan, and his no. 187 from Lansing;

[1] Ill., II. 96.

[2] Ibid. 98.

Wheeler's specimens from Grand Ledge, Michigan; Macoun's 1876 material from Quesnelie, British Columbia, with specimens of *C. pilulifera* from Berne, Switzerland (*Seringe*); Stockholm, Sweden (*Andersson*); Finland (*Simming*); the Grosser Pfalzberg, Austria (*Halácsy*, no. 1064), and St. Petersburg, Russia (*Turczaninow*); shows conclusively that the remoteness of the spikelets is not to be relied upon in separating our smaller American material from the European plant. In the accompanying tabulation of measurements from European specimens and the smaller form of the American plant it will be seen that in the length of the inflorescence and the number, length and remoteness of spikelets essentially identical conditions are found, although the European material shows a tendency to a reduction in the length of the rachis between spikelets, thus passing to the short-headed var. *pallida*, while the American plant varying toward the elongated variety *longibracteata* shows a natural lengthening of the rachis.

Dr. Boott laid stress upon the more abundantly flowered spikelets of *C. pilulifera*, but an examination of the European material shows that this character is maintained only in the extreme specimens with unusually full spikelets. In the others many spikelets are found bearing less than ten flowers while not a few have only four or five. The presence or absence, in the American or the European plant, of staminate flowers at the tips of the pistillate spikelets is likewise a character upon which little reliance can be placed. Both Goodenough [1] and Dr. Boott [2] noted this tendency in European specimens and in a sheet of Austrian material it is very conspicuous. In America likewise this tendency to androgynous spikelets occurs, but it seems to be quite as unusual as in Europe.

The pale or castaneous scales of *Carex communis* were emphasized by Dr. Boott as opposed to the purple scales of *C. pilulifera*. Students of American Carices, however, are all familiar with specimens of *C. communis* from sunny or open situations in which the scales are quite as purple (or rather maroon) as in *C. pennsylvanica;* and many specimens of European *C. pilulifera* show quite as little color in the scales as do the commoner plants of America.

The basal nerves supposed to distinguish the perigynium of *C. communis* from that of *C. pilulifera* are also quite as often wanting as present; and although Dr. Boott laid stress upon this character in his comparative note, he described the perigynia of *C. communis* (his *C. varia*) as "enerviis vel basi plus minus nervatis pallidis." The length,

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[1] Trans. Linn. Soc., II. 191.

[2] Ill., II. 96.

TABLE OF MEASUREMENTS OF EUROPEAN *Carex pilulifera* AND THE SMALLER FORM OF AMERICAN *C. communis*.

European Specimen.	Collector.	Length of Inflorescence in mm.	Length of staminate Spikelet in mm.	Number of pistillate Spikelets.	Length of pistillate Spikelet in mm.	Distance in mm. between lowest Spikelets.	Length of Perigynia in mm.	Length of Beak in mm.
Strömbacka, Sweden . .	Laurén	12–18	6–8	2–3	4.5–6	4.5–7	3.4	0.6
Finland	Simming	16–19	6–7	3–4	4	8	2.8	0.8
Stockholm, Sweden . .	Andersson	17–22	10–11	2–3	7	5–7	2.7	0.7
Halifax, England . . .	Leyland	13–22	7–10	2–3	5.5	5–10	3.0	0.7
Dresden, Germany . . .		20	9–13	3	4–6	7.5	2.9	0.7
Halle, Germany	A. Schulz	18–23	8–9	4	4–8.5	9	3.0	0.8
Berne, Switzerland . .	Seringe, no. 1238	17–22	10	2–3	4.5–7	3.5–7	3.0	0.8
Upsala, Sweden	Angström	14–26	9–16	2–4	5–9	3–9	2.8	0.7
Kyffhauser (Mt.), Germ'ny		17–22	11	3	6–8	6	3.0	0.7
Grosser Pfalzberg, Austria	Halácsy, no. 1064	14–26	7–18	1–3	3–6	3.5–6 5	2.7	0.9
Salzburg, Austria . . .	Hoppe	26–32	11–13	4–5	6–11	6–9	3.0	0.7
St. Petersburg, Russia .	Turczaninow	18–23	9–11	2	5–7	6–9	2 9	0.7
Upsala, Sweden	Tuckerman	25	10	4	6–8	9	3.0	0.8
Snowdon, Wales . . .	J. Ball	18	6.5	3	6	6	2.9	0.8
Extremes in Europe . .		12–32	6–18	1–5	3–11	3–10	2.7–3.4	0.6–0.9
American Specimen.								
Keweenaw Co., Mich. . .	Farwell, no. 653	10–13	4	2–3	4	5–6	3.3	0.8
Alcona Co., Mich. . . .	Bailey	15–19	4–8	2	5–7	7–15	3.2	0.8
Burlington, Vt.	Jones & Eggleston	11–23	6–13	1–2	6–8.5	7–8	3.2	0.8
Quesnelle, Brit. Columbia	Macoun	15–23	9–10	2–3	5–6	5–10	3.0	0.7
Grand Ledge, Mich. . .	Wheeler	18–19	8	3	5–6	6–9	3.3	0.8
Mt. Mosalamoo, Vt. . .	Brainerd	17–23	8	3	4–6	7–12	2.4	0.8
East Mt., Middlebury, Vt.	Eggleston, no. 434	17–24	9–11	2–3	5–6.5	5–13	2.6	0.9
Willoughby Mt., Vt. . .	Faxon	13–26	6.5–10	1–2	4–6	8–12	3.0	0 7
Lake Memphremagog, Q'b.	Faxon	13–29	3.5–9.5	2–4	4–8.5	7–11	3.0	0.9
Craggy Mt., No. Carolina	Biltmore Herb., no. 4897[b]	21–31	9–16	2–3	4–8	7–11	2.8	0.7
Orono, Me.	Fernald	23–36	6–13	3–4	4–9	11–12	3.1	1.0
Franconia, N. H. . . .	Faxon	24–39	8–11	3–4	4–9	7–15	3.3	0.8
Milwaukee, Wis. . . .	Lapham	30–35	14	3	4–7	9	3.0	0.9
Lansing, Mich.	Bailey, no. 187	25–39	13–18	2	4–8	11–14	3.2	0.8
Extremes in America . .		10–39	3.5–18	1–4	4–9	5–15	2.4–3.3	0.7–1.0

bending, and orifice of the beak show likewise considerable variation in Old World specimens, all of which can be matched by our plant, while the curving of the base of the style is a tendency not infrequent in American as well as European specimens. On the other hand, the straight style supposed to characterize the American plant is clearly represented by Lange in his plate of *C. pilulifera*, var. *longibracteata*.

The deeper purple coloring of the lower sheaths of the American plant, a character much emphasized by authors, is not a satisfactory distinction. The color in the American plant is usually conspicuous and is pronounced by Mr. F. Schuyler Mathews a dilute maroon with no true purple tendency, but rather fading in the older sheaths to chestnut. Mr. Mathews, who has likewise examined the sheaths of European specimens, finds the same red present in them. This color of the sheaths generally fades with age, yet in specimens collected by John Ball on Snowdon, by Andersson at Stockholm in 1860, by Laurén at Strömbacka in 1855, and by Tuckerman at Upsala in 1841 or 1842, show quite as conspicuous a red as the average American plant.

The bright green color of the leaves of *C. pilulifera* has likewise been maintained as a character separating that plant from the American *C. communis*. From dried specimens alone it is impossible to make this distinction apparent, although the fresh plant may sometimes show a brighter color than is often seen in *C. communis*. Yet in the American plant the leaves vary from a weak to a deep green, and in Bailey's var. *Wheeleri*, which is certainly inseparable from European specimens of *C. pilulifera*, the leaves were originally described as "bright green."

The length of the staminate spikelet and the breadth of the leaves, two characters upon which stress is sometimes laid, were not emphasized by Dr. Boott. An examination of the accompanying table of measurements of the inflorescence will show that the length of the staminate spikelets is thoroughly inconstant and not concomitant with other characters. In fact, both short and long staminate spikelets are often found on the same individual, as shown by Halácsy's no. 1064 of the Austro-Hungarian Exsiccatae (staminate spikelets from 7 to 18 mm. long), by Fernald's no. 151 from Maine (spikelets 6 to 13 mm. long), and a Faxon plant from Franconia, New Hampshire (spikelets from 8 to 14 mm. long). The variations in the breadth of the leaf, likewise, are very great on both continents. The young leaves at the fruiting season are naturally much narrower than the old and weather-beaten ones, which, unfortunately, are too often torn away in the preparation of attractive specimens. Measurement of the breadth of these older leaves

where present shows in the American plant a variation from 2 to 5.5 mm. and in the European from 2 to 4.5 mm. These measurements, however, include the largest American form, in which all the parts are conspicuously more developed than in the smaller American and the apparently identical European plant.

The length of the lower bract, emphasized in the descriptions of *C. pilulifera*, var. *longibracteata* and var. *Leesii*, seems to the writer an unfortunate character to make prominent. In America, at least, this elongation of the bract accompanies no other definable character. It is a purely vegetative development which may occur either in the large form (*C. varia* [typical] of Boott's Ill. t. 288) or in the smaller *C. communis*, var. *Wheeleri* with shorter inflorescence and more approximate spikelets.

This study of the European *Carex pilulifera* and the American *C. communis* (*C. varia* of many authors) has led to the following conclusions. The form of *C. pilulifera* of Europe with the pistillate spikelets subapproximate or slightly remote, the lowest from 0.5 to 1 cm. apart, is also common in America, where the plant has passed generally as *C. varia*, var. *minor*, Boott; *C. communis*, Bailey, and *C. pedicellata*, Britton, in part; or *C. communis*, var. *Wheeleri*, Bailey (*C. pedicellata*, var. *Wheeleri*, Britton). Another European form, the large *C. pilulifera*, var. *longibracteata*, Lange, is rare in Europe, but in America is represented by the large extreme which has passed as *C. varia* and later as *C. communis* and *C. pedicellata*. The American plants, then, should be called

C. PILULIFERA, L. Culms 1 to 5 dm. high, usually overtopping the leaves: inflorescence 1 to 3.5 cm. long, the lowest spikelet subtended by a short and narrow or sometimes elongated broad bract: staminate spikelet from green to chestnut-brown or maroon, sessile or stalked, 3.5 to 20 mm. long; pistillate spikelets 1 to 5, loosely flowered, 4 to 11 mm. long, sessile or short-pedicelled, subapproximate or slightly remote, the lowest rarely 1.5 cm. apart: perigynia hairy, obscurely 3-angled, 2.5 to 3.5 mm. long, the body plump, obovoid or subglobose, with a more or less elongated spongy nerveless or slightly nerved stipitate base; the beak broad, bidentate, rarely 1 mm. long, nearly or quite equalled by the green brown or reddish-brown ovate acuminate scale. — Sp. 976; Gooden. Trans. Linn. Soc. ii. 190; Schk. Riedgr. 78, t. I, fig. 39; Andersson, Cyp. Scand. 30, t. 7, fig. 82; Reichb. Ic. Fl. Germ. viii. t. 260; Boott, Ill. ii. 96, t. 283. *C. filiformis*, Pol. Pl. Palat. ii. 581; Vahl, Fl. Dan. vi. t. 1048; not L. *C. Bastardi-*

ana, DC. Fl. Fr. vi. 293. *C. varia*, Authors, incl. Boott, Ill. l. c. 97, in part, not Muhl. *C. varia*, var. *pedicellata*, Dewey, Am. Jour. Sci. xi. 163, in part. *C. varia*, var. *minor*, Boott, l. c. t. 289. *C. communis*, in part, and var. *Wheeleri*, Bailey, Mem. Torr. Cl. i. 41. *C. pedicellata*, in part, and var. *Wheeleri*, Britton, Mem. Torr. Cl. v. 87, 88. — In dry soil, NEW BRUNSWICK to BRITISH COLUMBIA, NORTH CAROLINA, OHIO and WISCONSIN: common in EUROPE. Passing gradually to

Var. LONGIBRACTEATA, Lange. Coarser; the inflorescence often 5 to 8 cm. long, the usually fuller and longer pistillate spikelets remote, the lowest 1.5 to 4 cm. apart: perigynia larger, more ellipsoid or spindle-form, with longer beak. — Haandb. Dansk. Fl. 621, & Fl. Dan. xvii. 12, t. 3050; Kneucker, Allgem. Bot. Zeitschr. (1898) 128. *C. varia*, Authors, in part, incl. Boott, l. c. t. 288, not Muhl. *C. varia*, var. *pedicellata*, Dewey, l. c., in part. *C. saxumbra*, F. A. Lees, Jour. Bot. xix. 25. *C. pilulifera*, var. *Leesii*, Ridley, Jour. Bot. xix. 98, t. 218. *C. communis*, Bailey, l. c. in part. *C. pedicellata*, Britton, l. c. in part. — NEW BRUNSWICK to IOWA and GEORGIA: rare and local in northern EUROPE.

CAREX PENNSYLVANICA.

Carex pennsylvanica, Lam., is one of the widest-distributed of the North American Carices, and as one of the earliest-flowering it is perhaps better known to the general botanist than any of the other species. In the length and breadth of its leaves, the comparative height of its culm, etc., the plant shows considerable variation, and many formal varieties have been based upon these characters. But since they are all of a purely vegetative nature, often produced in a colony of the species by changes of ecological conditions, none of these variations seem to the writer of sufficient constancy to merit recognition as more than trivial forms. The color of the spikelets, also, a character too commonly relied upon to separate *C. pennsylvanica* from the closely related *C. pilulifera*, L. (*C. communis*, Bailey), is not to be accepted as final, since *C. pennsylvanica*, ordinarily characterized by dark reddish brown scales, may often have them pale or even straw-colored when growing in deep shade. Furthermore, *C. pilulifera* in northern Europe as well as in America is frequently found with dark red scales, especially when growing in very sunny or exposed situations. The simplest means of distinguishing *C. pennsylvanica* from its nearest common ally is in its stoloniferous character; for when well developed the plant produces

conspicuous elongated stolons, while *C. pilulifera* (*C. communis*) is caespitose, with short assurgent basal shoots. As may be implied, varieties of *C. pennsylvanica* based upon color of the spikelets are quite as inconstant as are those based upon the length or breadth of the leaf, or other purely vegetative tendencies. In the character of its perigynia, however, *C. pennsylvanica* presents three marked variations which, from the material examined, seem to belong to well marked geographic areas. These forms of the plant are:

C. PENNSYLVANICA, Lam. Dict. iii. 388. Strongly stoloniferous; the slightly caespitose small stools with reddish bases: leaves soft, comparatively narrow, 1.5 to 3.5 mm. broad, 0.5 to 5 dm. long, shorter than, equalling, or often exceeding the slender culms: pistillate spikelets 1 to 4, globose or ovoid, loosely flowered, approximate or more or less remote, the lowest rarely peduncled, often subtended by a narrow leafy bract: scales usually maroon or red-tinged, rarely pale: perigynia from subglobose to obovoid, puberulent, the short bifid beak one-fourth to one-fifth as long as the body: staminate spikelet clavate, 1 to 2 cm. long, sessile or short-stalked, usually reddish, rarely straw-colored. — In dry or sandy soil from Cumberland Co., MAINE, to ALBERTA, south to GEORGIA and NEW MEXICO. It is impossible to say from the original description whether this or the following variety was intended by Lamarck, but the commonest form of the species has been accepted as typical since it was so considered by Boott, Kunze, and other classic writers on the genus. The varieties and forms described by Peck (46 Rep. N. Y. Mus. Nat. Hist. 51; 48 Rep. 76) appear to be vegetative states due largely to different degrees of light and exposure.

Var. **lucorum**. Perigynium puberulent or glabrate, with a conspicuous slender beak nearly or quite as long as the body. — *C. lucorum*, Willd. Enum. Pl. Berol. Suppl. 63; Kunze, Car. 153, t. 39; Boott, Ill. ii. 98, t. 291, in part. — MAINE to MICHIGAN and "ARCTIC AMERICA," and in the mountains to NORTH CAROLINA. MAINE, Orono, May 31, 1890, June 4, 1898 (no. 2006) — *M. L. Fernald;* Cambridge (*F. S. Bunker*); Glassface Mt., Rumford, July 13, 1890 (*J. C. Parlin*): NEW HAMPSHIRE, Barrett Mt., New Ipswich, June 5, 1896 (*M. L. Fernald*): VERMONT, Chipman Hill, Middlebury, May 30, 1897, Burlington, June 16, 1898 (*E. Brainerd*); Pownal, May 29, 1898 (*J. R. Churchill*): MASSACHUSETTS, Spot Pond, Stoneham, May 29, 1855, Malden, June 11, 1861, Medford, May 21, 1865, Blue Hills, Milton, June 3, 1870 (*Wm. Boott*); Purgatory Swamp, Dedham, May 26, 1878 (*E. & C. E. Faxon*); Wilmington, May 14, 1899 (*E. F. Williams*):

Rhode Island, Cumberland (*S. T. Olney*): Connecticut, Southington, June 4, 1899 (*C. H. Bissell*); Fairfield, June 23, 1901 (*E. H. Eames*, no. 168): Michigan, Detroit, May 22, 1864, June, 1860, May 9, 1858 (*Wm. Boott*): Virginia, Harper's Ferry, May 7, 1881 (*John Donnell Smith*): North Carolina, Broad River, May, 1841 (*Rugel* according to Kunze, l. c.). The long slender beak of the perigynium and its essentially northern and montane range suggest that further knowledge of the plant may show it to be well distinguished from *C. pennsylvanica*. No other character has yet been found by which it can be recognized, and occasional individuals show transitions in the elongation of the beak.

Var. vespertina, Bailey, Mem. Torr. Cl. i. 74. Rather coarser than the species: the usually very dark staminate spikelet peduncled: perigynia more coarsely hairy, almost hirsute. — The northwestern form, from the Cascade Mts. of British Columbia to Oregon and Vancouver Island.

Carex umbellata.

Like *C. pilulifera* and *C. pennsylvanica*, *C. umbellata*, Schkuhr, presents considerable variation in the length and breadth of its leaves and in the length of its culms and peduncles. As in those species, likewise, these purely vegetative characteristics in *C. umbellata* seem to accompany no fixed characteristic of the perigynia, nor any special geographic areas; and too often the long-peduncled spikelets of the so-called var. *vicina* may be found on portions of a clump which is otherwise good *C. umbellata*. As in the related species just discussed, however, *C. umbellata* presents at least two geographic tendencies seemingly characterized by constant differences in the perigynia. A third form, of which we as yet know too little, has the perigynia glabrous, thus breaking through one of the distinguishing marks of the *Montanae*.

Carex umbellata is related on the one hand to *C. nigro-marginata*, and on the other to *C. deflexa*. From these two it is usually distinguished without difficulty, but occasional specimens occur which are perplexing. The writer has found that in such cases the best means of distinction between *C. umbellata* and *C. nigro-marginata* is offered by the thickness of the perigynia. In *C. nigro-marginata* the mature perigynia vary from 1.3 to 1.6 mm. in thickness, while in mature *C. umbellata* they are from 1.7 to 2.4 mm. thick. From doubtful forms of *C. deflexa*, *C. umbellata* may best be distinguished by an examination of the scales. In *C. umbellata* the scales are nearly or quite as long as the subtended perigynia, while in *C. deflexa* they are distinctly shorter.

The most marked tendencies of *C. umbellata* are

C. UMBELLATA, Schkuhr, Riedgr. Nachtr. 75, t. Www, fig. 171 (*C. umbellata*, var. *vicina*, Dewey, Am. Jour. Sci. xi. 317 & x. t. D, fig. 13). Low and conspicuously caespitose, forming dense mats: leaves rather stiff, 0.5 to 4.5 dm. long, 1 to 4.5 mm. wide: culms mostly very short and crowded at the base of the leaves, or some elongated, rarely even to 2 dm., and bearing both staminate and pistillate, or staminate spikelets alone: pistillate spikelets 1 to 4, ovoid or oblong, 0.5 to 1 cm. long, sessile or on short or occasionally elongate-capillary peduncles: perigynia plump, stipitate or substipitate, puberulent, 3.2 to 4.7 mm. long; the slender beak nearly or quite as long as the ellipsoid-ovoid to subglobose or pyriform body, and about equalled by the ovate acuminate green or purple-tinged scale: staminate spikelets subsessile or peduncled, 6 to 12 mm. long. — Dry sandy or rocky places, PRINCE EDWARD ISLAND to central MAINE, west to SASKATCHEWAN and BRITISH COLUMBIA, and south to NEW JERSEY, DISTRICT OF COLUMBIA, and INDIAN TERRITORY.

Var. **tonsa**. Similar, but with the perigynia glabrous or merely puberulent on the angles of the long beak. — MAINE, Streaked Mt., Hebron, June 2, 1897 (*J. A. Allen*): CONNECTICUT, rocky wooded slope of Lantern Hill, North Stonington, May 30, 1901 (*C. B. Graves*). A plant with identical glabrous perigynia is figured in Boott, Ill. ii. t. 293, from specimens collected at Methy Portage, ATHABASCA, by *Sir John Richardson*. This and the New England plant represent a tendency unusual in the *Montanae*.

Var. BREVIROSTRIS, Boott, Ill. ii. 99, t. 294. Perigynia rather smaller, the broad beak short, about one-third as long as the plump short-hairy body. — The commonest form from SASKATCHEWAN to VANCOUVER ISLAND, south in the mountains to CALIFORNIA and NEW MEXICO: also MAINE, Fort Kent, Ashland, Masardis, Island Falls and Foxcroft (*M. L. Fernald*, nos. 2111, 2112, 2113, 2114, 2115); summit of Sargent Mt., Mount Desert Island (*E. & C. E. Faxon*): NEW HAMPSHIRE, Mt. Willard, and Bald Mt., Franconia (*E. & C. E. Faxon*).

CAREX VAGINATA and C. SALTUENSIS.

C. VAGINATA, Tausch, Flora (1821) 557 (*C. vaginata*, var. *alto-caulis*, Dewey, Am. Jour. Sci., Ser. 2, xli. 227. *C. saltuensis*, Bailey, Mem. Torr. Cl. i. 7. *C. altocaulis*, Britton, in Britton & Brown, Ill. Fl. i. 326, fig. 773). The American plant was long considered by Francis Boott

and other caricologists identical with the European; but in 1866 the New York plant was distinguished by Dewey, on account of its tall slender culm, narrow leaves and loose spikelets as var. *alto-caulis*. In 1889, however, Professor Bailey raised the American plant to specific rank as *C. saltuensis*, separating it from the European *C. vaginata* "by its much more slender and less caespitose habit, narrower leaves and less conspicuous sheaths, its alternately-flowered spikes, and its much smaller, less inflated, and conspicuously nerved perigynium." And Dr. Britton, following Professor Bailey's lead in treating the plant as strictly American, has taken up for it Dewey's varietal name as *altocaulis* (not *alto-caulis*).

That American specimens from the deep swamps of western New York, Ontario and Michigan are more slender than some European specimens there can be no doubt; but in northeastern Maine, where the plant is a common species of arbor-vitae swamps, it varies greatly in these characters. Individuals growing in excessive shade are naturally taller and more slender than those in bright light; and the spikelets vary indiscriminately from the slender alternate-flowered tendency supposed to characterize the American plant to the dense-cylindric form said to distinguish the European.

The height of the European plant, too, is often as great as that of the American, while our own plant sometimes fruits when scarcely 2 dm. high (Mt. Albert, Quebec — *Allen;* Blaine, Maine — *Fernald*). A specimen from Christiania collected by Blytt is 5 dm. high, while the extreme height given by Dr. Britton for his *C. altocaulis* is 2 feet (6 dm.).

The breadth of the leaf, likewise, is as variable on one continent as on the other. Both Dewey and Bailey have maintained that the European plant is broader-leaved; yet a specimen from Fries collected in Jemtland (Sweden) has leaves from 1.5 to 1.75 mm. wide, while the broadest leaves seen on the European plant are those of a Lapland specimen (5 mm. wide) from N. J. Andersson. In the American plant the leaves vary from 1.5 mm. wide (Blaine, Maine) to 5 mm. (Montreal).

The variation in the density of the spikelet in the American plant has been already mentioned. In Europe the same variation occurs, specimens from Jemtland (*Ahlberg*), Lapland (*Andersson*) and Finland (*Lehmann*) having the spikelets as loosely flowered as in the most extreme American form.

Nor are the differences assigned by Professor Bailey to the perigynia maintained in mature specimens. Young individuals of the American as well as the European plant have the nerves poorly developed, but in

mature fruit no difference is apparent between plants from Christiania, Norway, and Aroostook Co., Maine.

The sheath, said by Professor Bailey to be "less conspicuous" in the American plant, is 4 cm. long, by 2.7 mm. wide in one of Macrae's Montreal specimens, fully as conspicuous as in the best developed European material. There is, then, no reason why the American *Carex saltuensis*, Bailey (*C. altocaulis*, Britton) with no constant vegetative or morphological character and with a broad range from northern Labrador to the Mackenzie River, northern New England, New York, the Great Lakes and the upper Rocky Mts., should be treated as distinct from *C. vaginata* of Greenland, northern Europe and Asia.

Carex capillaris.

C. capillaris, L. Sp. 977. The Linnaean plant was the low plant of the Scandinavian mountains, described as a span high. This plant, well represented in the Gray Herbarium by European specimens from Andersson, Holmgren, Hoppe, Lehmann, Tuckerman, and others, varies in height from 3 to 25 cm., the spikelets being subapproximate or scarcely remote, the lower at most 2 cm. apart. This dwarf plant occurs likewise in Greenland and northeastern Asia. It has been examined from the following regions in America — Labrador, Dead Islands (*J. A. Allen*): Newfoundland, without locality (*La Pylaie*); Middle Arm, Bay of Islands (*A. C. Waghorne*): Quebec, dry stony ground, near summit — 1,150 m. — Mt. Albert (*J. A. Allen*): Maine, Mt. Kineo (*T. C. Porter et al*): New Hampshire, Mt. Washington (*Wm. Oakes et al*): Colorado, Rocky Mts., alt. 3,385 m. (*E. L. Greene* in Exsicc. Olney); South Park (*J. Wolfe*, no. 1059); Clear Creek, Georgetown, alt. 2,615 m. (*H. N. Patterson*, no. 144, in part): Utah (*S. Watson*, no. 1261): Wyoming, La Plata Mines (*E. Nelson*, no. 5260).

Var. elongata, Olney, in herb. & in Rothr. Prelim. Rep. Wheeler Pl. 53 (as *nomen nudum*). Tall, 2 to 6 dm. high, forming loose stools: pistillate spikelets remote, often 6 or 8 cm. apart. — Mossy woods and sphagnum-swamps. Rupert Land, Lake Mistassini (*J. M. Macoun*): Newfoundland, Coal River, Bay of Islands (*A. C. Waghorne*, no. 24): Quebec, Ste. Anne des Monts and Little Metis (*J. A. Allen*): New Brunswick, Drury's Cove, St. John (*Wm. Boott*): Maine, Fort Fairfield (nos. 140, 2029), Blaine (no. 2028), Mars Hill — *M. L. Fernald*: New York, Otter Creek, near Cortland (*S. N. Cowles*):

Ontario, Bruce Co. (*J. Macoun*): Michigan, Point de Tour (*Wm. Boott*); Port Huron (*C. K. Dodge*): Saskatchewan (*Bourgeau*): Assiniboia, Assiniboine River (*J. Macoun*): Alberta, Bow River (*J. Macoun*): Colorado, Rocky Mts., alt. 2460 m. (*E. L. Greene* in Exsicc. Olney); Twin Lakes (*J. Wolfe*, no. 1060 [type]); Clear Creek (*Parry*, no. 386, *Patterson*, no. 144, in part): Utah, Aquarius Plateau (*L. F. Ward*, no. 484): Idaho, Lake Pend d'Oreille (*Sandberg, MacDougal & Heller*, no. 751). A plant confined in the East to arbor-vitae swamps at low altitudes, and in its tall lax habit and very distant spikelets hardly suggesting the dwarf alpine *C. capillaris* with approximate spikelets. Somewhat similar specimens in the Gray Herbarium from Salzburg, Austria, suggest that the same form may be present in Europe.

INDEX TO SPECIES.

Carex
adusta, 451, 452, 464, 476, 478, 479, 480, 481.
" var. argyrantha, 478.
" " glomerata, 481.
" " minor, 471.
" " sparsiflora, 480.
aenea, 461, 462, 464, 480.
alascana, 482.
alata, 448, 450, 451, 463, 476.
" var. ferruginea, 463, 477.
albolutescens, 448, 450, 451, 452, 464, 472.
" var. argyrantha, 478.
" " cumulata, 472.
" " glomerata, 481.
" " sparsiflora, 452, 453, 480.
altocaulis, 507, 508, 509.
approximata, 494.
aquatilis, 495, 496, 497.
" × stricta, 496.
" var. cuspidata, 497.
" " elatior, 496.
" " epigejos, 497.
" " sphagnophila, 497.
" " virescens, 497.
arcta, 458, 459, 466, 486.
argyrantha, 452, 478.
arida, 467.

Carex
atlantica, 454, 456, 457, 458, 485.
Bastardiana, 503.
Bebbii, 449, 462, 478.
Bicknellii, 450, 451, 463, 475.
Bolanderi, 490, 491.
" var. sparsiflora, 491.
brizoides, 487.
bromoides, 465, 490.
brunnescens, 453, 458, 459, 460, 466, 489.
" var. gracilior, 489.
Buckleyi, 489.
canescens, 453, 458, 459, 460, 466, 486, 487, 488, 491.
" β, 489.
" var. alpicola, 459, 489.
" " brunnescens, 489.
" " disjuncta, 466, 488.
" " dubia, 459, 487.
" " oregana, 458, 486.
" " polystachya, 458, 486.
" " robustina, 459, 487.
" " sphaerostachya, 489.
" " subloliacea, 459, 466, 488.
" " vitilis, 489.
" " vulgaris, 458, 459, 486, 489.
capillaris, 509, 510.

Carex
capillaris, var. elongata, 509.
Carltonia, 495.
cinerea, 487.
communis, 497, 498, 499, 500, 501, 502, 503, 504, 505.
" var. Wheeleri, 502, 503, 504.
Crawfordii, 461, 469.
" var. vigens, 462, 470.
cristata, 450, 462, 469, 472, 473.
" var. mirabilis, 473.
cristatella, 472.
curta, 453, 487.
" var. brunnescens, 489.
cyperoides, 481.
deflexa, 506.
Deweyana, 465, 490.
" var. sparsiflora, 491.
dioica, 482.
echinata, 447, 453, 454, 455, 456, 458, 465, 483, 485, 492.
" var. angustata, 465, 484.
" " cephalantha, 455, 456, 465, 484.
" " conferta, 485.
" " excelsior, 465, 484.
" " microstachys, 454, 455.
" " ormantha, 465, 483.
elachycarpa, 467, 492.
elongata, 453, 487.
Emmonsii, 498.
exilis, 453, 460, 465, 482, 495.
" var. androgyna, 482.
" " squamacea, 482.
festiva, 474.
festucacea, 450, 451, 464, 475, 477.
" var. brevior, 464, 474, 477.
" " mirabilis, 473.
" " tenera, 474.
filiformis, 503.
foenea, 449, 451, 452, 462, 464, 472, 478.
" var. β, 450, 451, 477.
" " γ, 476.
" " (?) ferruginea, 451, 477.
" " perplexa, 452, 464, 478, 480.
" " sparsiflora, 480.
" " (?) subulonum, 476.
furva, 494.
Gebhardii, 453, 459, 489.
glareosa, 466, 493.
gynocrates, 453, 460, 465, 482, 495.
" var. monosperma, 482.
heleonastes, 459, 467, 494.
helvola, 492.
interior, 454, 457, 458, 465, 485, 493.
" var. capillacea, 465, 485.
Kunzei, 486.
Lachenalii, 494.
laeviculmis, 491.
lagopina, 466, 487, 494.
lagopodioides, 468, 469.
" var. cristata, 472.
" " mirabilis, 473.
" " moniliformis, 469.
" " scoparia, 468.
lapponica, 488.
Leersii, 483.
leporina, 449, 462, 464, 468, 479, 494, 495.
" var. bracteata, 472.
Liddoni, 469, 471.
lucorum, 505.
marina, 495.
mirabilis, 450, 462, 463, 472, 473.
" var. perlonga, 462, 473.
" " tincta, 462, 473.
monosperma, 482.
muricata, 483.
muskingumensis, 461, 463, 467.
nigro-marginata, 506.
norvegica, 466, 485, 492, 493.
oronensis, 462, 471.
ovalis, 479.
pallida, 469.
parviflora, 494.
pedicellata, 499, 503, 504.
" var. Wheeleri, 503, 504.
pennsylvanica, 500, 504, 505, 506.
" var. lucorum, 505.
" " vespertina, 506.
Persoonii, 489.
pilulifera, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506.
" var. Leesii, 498, 499, 503, 504.
" " longibracteata, 498, 499, 500, 502, 503, 504.
" " pallida, 498, 500.
pinguis, 481.
pratensis, 471.
" var. furva, 452.

Carex
praticola, 452, 461, 462, 464, 471.
Redowskiana, 482.
remota, 490.
Richardi, 487.
saltuensis, 507, 508, 509.
saxumbra, 504.
scirpina, 458, 485.
scirpoidea, 457, 458, 485.
scirpoides, 453, 454, 455, 457, 458, 485.
scoparia, 447, 448, 449, 460, 461, 463, 467.
" var. condensa, 461, 468.
" " lagopodioides, 468.
" " minor, 447, 448, 449, 470.
" " moniliformis, 449, 461, 468, 469.
" " muskingumensis, 467.
seorsa, 458, 460, 465, 486, 491.
siccata, 461, 469.
silicea, 463, 464, 476.
sparsiflora, 453, 480.
sphaerostachya, 489.
stellulata, 454, 455, 456, 483.
" γ, 485.
" var. angustata, 455, 484.
" " conferta, 485.
" " scirpina, 457, 485.
" " scirpoides, 457, 485.
" " sterilis, 485.
sterilis, 453, 454, 455, 456, 457, 458, 465, 483, 484.
" β, 484.
" var. aequidistans, 484.
" " angustata, 484.
" " cephalantha, 484.
" " excelsior, 455, 458, 484.
straminea, 447, 448, 450, 451, 462, 463, 474, 477.
" var. alata, 476.
" " aperta, 451, 475.
" " brevior, 450, 451, 476, 477.
" " chlorostachys, 472.
" " Crawei, 450, 451, 475.
" " cristata, 472.
" " cumulata, 472.
Carex
straminea, var. echinodes, 463, 474.
" " ferruginea, 451, 477.
" " festucacea, 477.
" " foenea, 472.
" " intermedia, 472.
" " invisa, 475.
" " Meadei, 475.
" " minor, 474.
" " mirabilis, 473.
" " moniliformis, 476.
" " Schkuhrii, 477.
" " silicea, 476.
" " tenera, 474, 475.
" " typica, 477.
sychnocephala, 464, 481.
tenera, 448, 450, 451, 463, 474, 475.
" var. invisa, 463, 474, 475.
" " major, 475.
" " Richii, 463, 464, 474, 475, 476.
" " suberecta, 477.
tenuiflora, 466, 486, 491.
tribuloides, 449, 450, 461, 468.
" var. Bebbii, 478.
" " cristata, 472, 473.
" " moniliformis, 449, 468, 469.
" " reducta, 449, 461, 468, 469, 474.
" " turbata, 461, 469.
trisperma, 466, 492.
Tuckermani, 449.
umbellata, 506, 507.
" var. brevirostris, 507.
" " tonsa, 507.
" " vicina, 506, 507.
vaginata, 507, 508, 509.
" var. alto-caulis, 507, 508.
varia, 498, 499, 500, 503, 504.
" var. minor, 499, 503, 504.
" " pedicellata, 504.
vitilis, 458, 459, 489.
xerantica, 462, 464, 479.
Vignea
Gebhardi, 489.
stellulata, 483.

EXPLANATION OF PLATES.[1]

Plate I.

Carex muskingumensis: Fig. 1, spike; Fig. 2, perigynium.
C. scoparia: Fig. 3, spike; Fig. 4, perigynium.
C. scoparia, var. *condensa:* Fig. 5, spike.
C. tribuloides: Fig. 6, spike; Fig. 7, perigynium.
C. tribuloides, var. *reducta:* Fig. 8, spike.
C. siccata: Figs. 9, 10, spikes; Fig. 11, perigynium.
C. Crawfordii: Fig. 12, spike; Fig. 13, perigynium.
C. Crawfordii, var. *vigens:* Fig. 14, spike.
C. oronensis: Fig. 15, spike; Fig. 16, perigynium.
C. praticola: Fig. 17, spike; Fig. 18, perigynium.
C. cristata: Fig. 19, spike; Figs. 20, 21, perigynia.
C. albolutescens: Figs. 22, 23, spikes; Fig. 24, perigynium.

Plate II.

C. mirabilis: Fig. 25, spike; Fig. 26, perigynium.
C. mirabilis, var. *perlonga:* Fig. 27, spike.
C. straminea: Fig. 28, spike; Fig. 29, perigynium.
C. straminea, var. *echinodes:* Fig. 30, spike.
C. tenera: Fig. 31, spike; Fig. 32, perigynium.
C. tenera, var. *Richii:* Fig. 33, terminal spikelet; Fig. 34, perigynium.
C. tenera, var. *invisa:* Figs. 35, 36, spikes.
C. Bicknellii: Figs. 37, 38, spikes; Figs. 39, 40, perigynia.
C. silicea: Fig. 41, spike; Fig. 42, perigynium.
C. alata: Fig. 43, spike; Fig. 44, perigynium.
C. alata, var. *ferruginea:* Fig. 45, spike; Fig. 46, perigynium.

Plate III.

C. festucacea: Fig. 47, spike; Fig. 48, perigynium.
C. festucacea, var. *brevior:* Figs. 49, 50, spikes; Fig. 51, perigynium.
C. Bebbii: Fig. 52, spike; Fig. 53, perigynium.
C. foenea: Fig. 54, spike; Fig. 55, perigynium.
C. foenea, var. *perplexa:* Fig. 56, spike; Fig. 57, perigynium.

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[1] The plates illustrating this synopsis were prepared by Mr. F. Schuyler Mathews from characteristic specimens. The figures of the spikes represent life-sized individuals, while those showing the *inner* faces of the perigynia are four times as large as in nature.

C. leporina : Figs 58, 59, spikes ; Fig. 60, perigynium.
C. xerantica : Fig. 61, spike ; Fig. 62, perigynium.
C. aenea : Figs. 63, 64, spikes ; Figs. 65, 66, perigynia.
C. adusta : Fig. 67, spike ; Figs. 68, 69, perigynia.
C. sychnocephala : Fig. 70, spike ; Fig. 71, perigynium.

Plate IV.

C. gynocrates : Figs. 72, 73, 74, 75, spikes ; Figs. 76, 77, perigynia.
C. exilis : Figs. 78, 79, 80, 81, 82, spikes ; Fig. 83, perigynium.
C. echinata : Figs. 84, 85, 86, 87, spikes ; Fig. 88, perigynium.
C. echinata, var. *ormantha :* Fig. 89, spike.
C. echinata, var. *excelsior :* Figs. 90, 91, spikes.
C. echinata, var. *cephalantha :* Figs. 92, 93, spikes ; Fig. 94, perigynium.
C. echinata, var. *angustata :* Figs. 95, 96, spikes ; Fig. 97, perigynium.
C. sterilis : Figs. 98, 99, spikes ; Fig. 100, perigynium.
C. interior : Figs. 101, 102, 103, spikes ; Figs. 104, 105, perigynia.
C. seorsa : Figs. 106, 107, spikes ; Figs. 108, 109, perigynia.

Plate V.

C. arcta. Figs. 110, 111, 112, spikes ; Fig. 113, perigynium.
C. canescens : Fig. 114, spike ; Fig. 115, perigynium.
C. canescens, var. *subloliacea :* Fig. 116, spike ; Fig. 117, perigynium.
C. canescens, var. *disjuncta :* Figs. 118, 119, spikes ; Fig. 120, perigynium.
C. brunnescens : Figs. 121, 122, spikes ; Fig. 123, 124, perigynia.
C. bromoides : Fig. 125, spike ; Fig. 126, perigynium.
C. Deweyana : Fig. 127, spike ; Fig. 128, perigynium.
C. tenuiflora : Fig. 129, spike ; Fig. 130, perigynium.
C. trisperma : Fig. 131, spike ; Fig. 132, perigynium.
C. elachycarpa : Fig. 133, spike ; Fig. 134, perigynium.
C. norvegica : Fig. 135, spike ; Fig. 136, perigynium.
C. glareosa : Fig. 137, spike ; Fig. 138, perigynium.
C. lagopina : Fig, 139, spike ; Fig. 140, perigynium.
C. heleonastes : Fig. 141, spike ; Fig. 142, perigynium.

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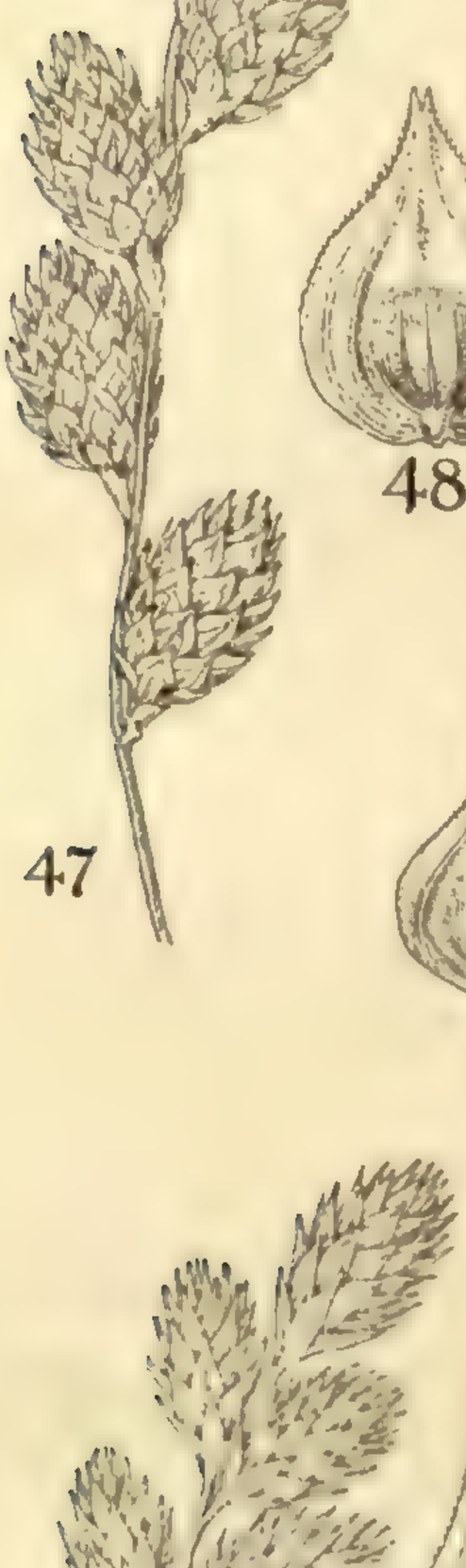

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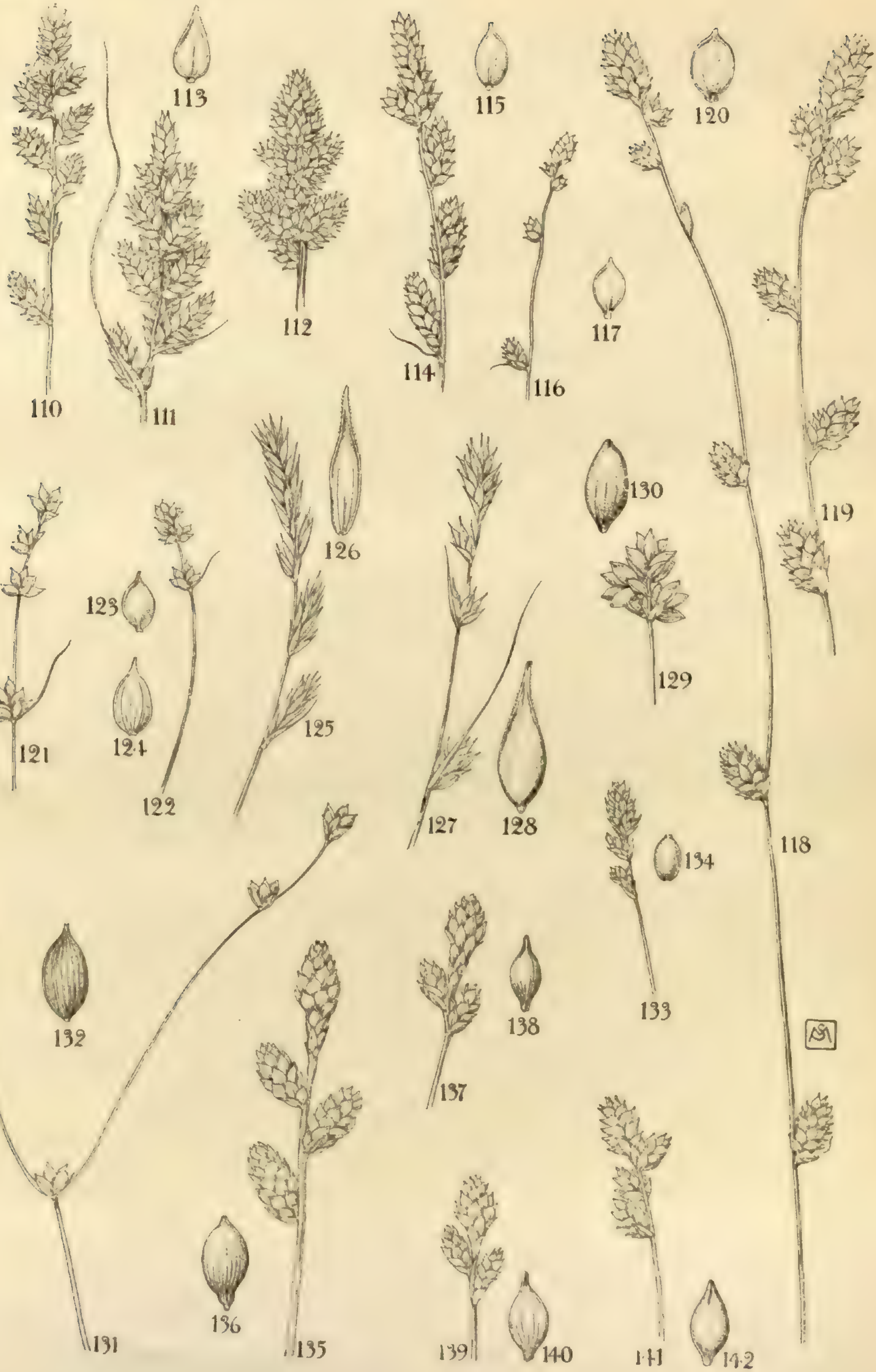
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OF HARVARD UNIVERSITY.

NEW SERIES NO. XXIII.

THE RELATIONSHIPS OF SOME AMERICAN AND OLD WORLD BIRCHES.

By M. L. Fernald.

From the American Journal of Science,

Vol. XIV, September, 1902.

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THE

AMERICAN JOURNAL OF SCIENCE

[FOURTH SERIES.]

Art. XX.—*The Relationships of some American and Old World Birches*; by M. L. Fernald. (With Plates V–VI.)

[Contributions from the Gray Herbarium of Harvard University, New Series, No. xxiii.]

A recent attempt satisfactorily to identify some birches from the alpine summits of New England has made it necessary to study in detail certain species of the Old World. In this detailed study so many well-known European and Asian forms have been found identical with trees and shrubs of America which have ordinarily passed as endemic, that the following notes are offered as a partial solution of the difficulties which have long surrounded the species of *Betula*. The writer has been specially fortunate in having constant access to a large suite of specimens in the Gray Herbarium which were examined and labelled by Regel in the preparation of his monograph on the Betulaceæ in DeCandolle's Prodromus.* The material in the United States National Herbarium and in the Herbarium of the Geological Survey Department of Canada has been generously loaned by Messrs. F. V. Coville and J. M. Macoun, the collections of the Arnold Arboretum have been placed at his disposal, and valuable specimens and notes on northwestern forms have been freely furnished by Professors L. F. Henderson and C. V. Piper. Thus it has been possible to examine a very complete representation of the genus.

The birches are trees of boreal range. Unknown in the southern hemisphere and the tropics, they abound throughout the northern and mountainous sections of North America, Europe and Asia, reaching a more extreme northern range on both continents than any other trees.† By Regel and other

* Regel in DC. Prodr., xvi, part 2 (1864), 161–189.

† See F. A. Michaux, Hist. des Arb., ii, 129, and Sylva, ii, 47; Sargent, Silva, ix, 46; Rehder in Bailey, Cyc. Am. Hort., i, 158.

early students of the group various European and American species were considered essentially identical; but among recent authors there has been an increasing tendency to regard nearly all American forms as endemic, and to maintain as organically distinct trees growing, for instance, on the American and the Asian sides of Behring Sea.

That there is not only a strong similarity, but a marked proportion of identity, in the herbaceous floras of the circumboreal regions has long been recognized; and, although the tendency to ignore this almost axiomatic truth has been conspicuous in the work of certain American as well as European botanists, the increasing evidence of its validity has forced itself upon the attention of others. This similarity in the boreal floras of the eastern and western hemispheres was very emphatically pointed out by Sir Joseph Hooker in his discussion of the Distribution of Arctic Plants.* Although our knowledge of the distribution and relationships of plants has very greatly increased since Hooker's tabulation was made, his outlines still furnish an approximately accurate basis for generalizations. If we consider the boreal distribution of some well-known northern genera whose species were then clearly interpreted, we shall find that of the 61 Arctic species of *Carex* recognized by Francis Boott, 58 extend southward into temperate Europe, 51 into temperate America, and 43 into temperate Asia; of the 16 Arctic *Junci* recognized by Hooker all 16 extend into temperate Europe, 15 into temperate America, and 14 into temperate Asia; of Hooker's 24 Arctic species of *Saxifraga*, 19 extend into temperate America, 17 into temperate Europe, and 14 into temperate Asia. This estimate is altered from that of Hooker only in so far as recent data has been immediately accessible to the writer; but it does not, of course, take into account such well-known species as *Carex riparia*, *C. Pseudo-Cyperus*, *Juncus tenuis*, etc., which occur in temperate regions of both hemispheres, though not within the Arctic Circle, but which, if counted, would increase the number of identical species in the eastern and western hemispheres.

Toward the warmer regions of each continent the number of identical plants rapidly diminishes, and the proportion of endemic species becomes very great. But in view of the marked similarity of the herbaceous vegetation of northern Europe, Asia and North America, it seems only logical to expect a notable proportion of identities between the trees and shrubs of boreal range, especially when, as in *Betula* and *Salix*, several species extend nearly or quite to the northern limits of

* J. D. Hooker, Trans. Linn. Soc., xxiii, pt. 2, 251–358; see also Gray, Mem. Am. Acad., n. s., vi, 377–449, and extract "Flora of Japan," in Sci. Pap. of A. Gray, selected by C. S. Sargent, ii, 124–141.

vegetation and are rapidly spread by means of their thin-winged or hairy fruit. In fact, this relation of the Alaskan willows to those of the Old World is brought out by Mr. F. V. Coville in his scholarly monograph on the Willows of Alaska,* in which he recognizes 23 species, 2 of them circumpolar in distribution, and 9 others occurring in Siberia. That is, of the 23 willows recognized by Mr. Coville in Alaska, only 12, or scarcely more than one-half, are endemic North American species. A similar detailed study of northeastern *Salices* will, it seems to the writer, likewise show a closer relationship between certain other American and Old World forms than has been generally recognized.

The examination of the birches by the writer has led to the uniting of some well-known American and Old World trees and shrubs. The conclusions reached in his studies, and certain details of the studies themselves, may best be presented by discussing separately the species which have been specially examined.

§ **Albæ.** Trees or shrubs: the wing two or three times as wide as the achene; rarely only a little broader.

Betula alba.

The original *Betula alba* of Linnæus† seems to have embraced both the common white birches of northern and central Europe. In 1788, however, Roth distinguished the two trees: "Betula *alba*. B. foliis ovato-acuminatis inciso-serratis scabris, ramis erectis strictis"; and "Betula *pendula*. B. foliis ovato-acuminatis inciso-serratis glabris, ramis flaccidis pendulis."‡ This separation of the two trees by Roth has been very generally ignored by recent European authors, nevertheless, and the species with pubescent ("scabrous") leaves and upright branches, the true *Betula alba* as interpreted by Roth, is universally known abroad as *B. pubescens*, Ehrh.,§ while the smooth-leaved species with pendulous branches, the *Betula pendula*, Roth., is ordinarily known by its later name, *B. verrucosa*, Ehrh.

By some authors, as Prantl‖ and Guerke,¶ these two white birches are treated as distinct species, while by others the entire group is regarded as a polymorphous species with many subspecies and varieties. Rehder, in Bailey's Cyclopedia of American Horticulture, disposes of the forms in this way,

* Proc. Wash. Acad. Sci., iii, 297-362 (1901).
† Sp., ii, 982 (1753).
‡ Roth, Fl. Germ., i, 404, 405 (1788).
§ Beitr., v, 160, vi. 98 (1790-91).
‖ Prantl in Engler & Prantl, Nat. Pflanzenf., iii, pt. 1, 45.
¶ Pl. Eur., ii, 47, 48.

recognizing *Betula alba*, with the two subspecies, *B. pendula*, Roth (*B. verrucosa*, Ehrh.), and *B. pubescens*, Ehrh., each with numerous marked variations. Mr. Rehder, however, keeps separate from the Old World *B. alba* the American *B. papyrifera* and *B. occidentalis.*

The most conservative treatment of the group was, in some particulars, that of Regel in DeCandolle's Prodromus, though many of his varieties have proved of little value. There Regel recognized two species of white birches (his section *Albæ*), *Betula alba*, L., and *B. microphylla*, Bunge. *B. alba*, however, he divided into nine subspecies:

verrucosa, with numerous varieties, from Europe, Asia and America;
populifolia, a well-known strictly American tree;
mandshurica, a local Asian tree;
latifolia, with varieties, from central and northern Asia to Japan and Kamtschatka;
occidentalis, with varieties, from North America;
papyrifera, with varieties, from North America and Siberia;
pubescens, with varieties, from Europe, Asia and North America;
tortuosa, from northern Europe and Siberia;
excelsa, a doubtful form referred to by earlier authors.

Thus it is clear that Regel, the most devoted student of the birches, found it impossible to distinguish as clear species the diverse trees and shrubs which pass as white or canoe birches.

The recently accumulated material shows that Regel's course was perhaps the most philosophic of any which has been proposed. Yet the primary characters of the trees, first clearly distinguished by Roth, are generally so constant that it seems better to the writer to recognize as species, i. e., as centers of variation, the two forms designated by him. These were the true *Betula alba*, with mostly stiff and ascending branches, the young branchlets puberulent or pubescent and the ovate often doubly serrate leaves more or less pubescent beneath, at least when young; and *B. pendula*, with more flexuous branches, the branchlets glabrous or verrucose with resiniferous atoms, and the deltoid or rhombic-ovate often simply serrate leaves glabrous, and more or less glutinous at least when young. These two trees in their characteristic forms are now very well understood abroad, though some of their reduced forms present perplexing problems. But since the days of Regel the American trees have been very generally regarded as endemic species, and it is to the discussion of this question that special attention is here directed.

Betula alba (as interpreted by Roth).

As already stated, *Betula alba*, L. (as interpreted by Roth) has passed in Europe as *B. pubescens*, and under this latter name it is ordinarily distinguished from *B. pendula*, Roth (*B. verrucosa*, Ehrh.). The species is generally recognized as occurring through northern and central Europe and across Asia, and by Regel and his followers it was regarded as likewise American, though by recent authors it has been excluded from our flora. The typical form of *B. alba* is the large White Birch of northern Europe, with ascending branchlets, puberulent or hairy twigs, and ovate or rhombic-ovate leaves more or less pubescent beneath, especially when young.

The representative of this tree in America is our common Paper or Canoe Birch, *Betula papyrifera*, Marsh.* (*B. papyracea*, Ait.†), which was discussed in detail by Michaux in his Sylva.‡ There Michaux wrote at such length as "will not be deemed superfluous by persons who justly appreciate the importance of precise ideas on subjects like the present," of the Canoe Birch (*B. papyracea*), the European White Birch (*B. alba*, including, at least in the illustration, *B. pendula*, Roth), and the American White or Old Field Birch (*B. populifolia*).

Michaux's plate of *Betula papyracea* is of a northern form very closely approaching var. *cordifolia*, Regel; and in commenting upon this tree he said "the bark is of a brilliant white, like that of the White Birch of Sweden, and, like that too, it is almost indestructible. . . . . This bark, like that of the European species, is devoted to many uses," which are very fully enumerated. In his discussion of the European *B. alba* he said, "The trunk and limbs of the large trees are covered with a thick bark, whose epidermis is white and perfectly similar to that of the White Birch [*B. populifolia*] and the Canoe Birch [*B. papyracea*]. The small branches likewise resemble those of the species just mentioned [*B. papyracea*], being slender, flexible, and of a brown color spotted with white." He then discussed the uses of the European White Birch, concluding his remarks with: "Such are the principal uses of the European Birch, all the valuable properties of which are completely united in the Canoe Birch of North America." In his discussion of *B. populifolia*, Michaux further said: "The trunk of this species is clad in a bark of as pure white as that of the Canoe Birch and of the European Birch; but its epidermis, when separated from the cellular tissue, is incapable of being divided, like that of the two preceding species, into thin sheets; which constitutes an essential

* Arbust. Am., 19 (1785). † Hort. Kew, iii, 337 (1789).
‡ Michaux, Sylva, ii, 50–57.

difference." And in his summary of characteristics, he said: "The White Birch of Europe and the Canoe Birch resemble each other in their wood, their bark, and their ample proportions, which are perhaps superior in the American species. They differ in the form of their leaves, and they grow on very different soils: the Canoe Birch is exclusively attached to rich lands constantly cool, and capable of yielding an abundant harvest of corn or of clover, and it propagates itself naturally only in that part of North America which corresponds in climate to the 54th and 55th degrees of latitude in Europe."

These distinctions pointed out by Michaux are not, however, of such fundamental importance as to prove the American Canoe Birch (*Betula papyrifera*) organically distinct from the White Birch (*B. alba*, L., *B. pubescens*, Ehrh.) of Europe. Michaux made no distinction in his Sylva between the true *Betula alba* and the smooth-leaved and smaller *B. pendula*, Roth. His plate was of the latter plant, which has more deltoid leaves than the true *B. papyrifera*, but is quite like another American tree soon to be discussed. The foliage of the true *B. alba* is, nevertheless, as will be seen on comparison of American and European material, so similar as to present no apparent distinctive feature. The Canoe Birch in its best development, which Michaux places at a height of 70 feet, is found in deep soil on hillsides; but, had that keen observer been permitted to remain longer in our northern regions and to have explored the upper slopes of our mountains, he would have found the same tree there growing from the crevices of bare ledges—quite as barren a soil as that occupied by the European tree, which, by his own statement, may be 70 or 80 feet high. The more southern occurrence of the American tree is at least negative evidence of its identity with the tree of Scandinavia, northern Germany and Russia, for, as is now well known, the isotherms which cross New England pass far to the north in Europe, and the vegetation of northern New England and adjacent Canada has more than once been compared with that of Scandinavia. In fact, Michaux himself, in discussing the range of the Canoe Birch, said: "This part of North America, though situated 10 degrees further south, very nearly resembles Sweden and the eastern part of Prussia, not only in the face of the soil, but in the severity of the climate." Thus the comparative notes of Michaux leave little by which to distinguish the American from the European tree; and it is further worthy of note that in Boswell Syme's enumeration of the uses of the bark of the European tree he says: "In Russia it is applied to the same purposes for which that of the Canoe Birch is used in North America, boats being formed of it that are nearly as light and portable as those made

by the Red Indians of Canada."* There is, then, no evidence from the descriptions and comparisons of Michaux and other well-informed European authors that the American *Betula papyrifera* is separable from the true *B. alba* of northern Europe.

The American tree presents numerous but apparently inconstant variations in the size and toothing of its leaves, and the size of its strobiles and achenes. These variations, however, are very closely matched by specimens in American herbaria of the European *Betula alba* (*B. pubescens*, Ehrh.). If, for example, we compare branches collected by Robert Chalmers at Campbellton, New Brunswick, in 1887, or Rydberg's No. 1,005, from the Black Hills of South Dakota (distributed as *B. occidentalis*) with a Bohemian specimen from Tausch and Russian material from Regel; Macoun's Cypress Hills (Assiniboia) material (No. 5,919) with Christiania (Norway) material from Blytt; a sheet in the Gray Herbarium, collected on Lake Winnipeg by Bourgeau, with Hampe's No. 1,321 from the Hartz Mts., in central Germany; or Clement's No. 2,919 from Nebraska and Medford (Massachusetts) material of Wm. Boott's with the 1807 sheet of *B. pubescens* sent by Regel to the Gray Herbarium; we cannot help being impressed by the identity of the pubescence, leaf-outline, strobiles, etc. Other comparisons of American and European specimens emphasize this identity; so that, in view of these facts and the essential similarity of bark, branches and stature, as pointed out by Michaux and others, there seems no question that *Betula papyrifera* is the true *B. alba* of Linnæus.

Betula alba, forma *occidentalis*.

In the discussion of *Betula papyrifera* in his Silva, Professor Sargent refers† to the tree of the northwest coast, a form which "differs from the eastern [*papyrifera*] in its greater height and rather darker colored bark, in its more pubescent branchlets, which sometimes do not become glabrous until their second season, although vigorous shoots of young plants in the east are often clothed with thick pubescence, and in its rather larger leaves, which, on the lower surface, are also more pubescent." Later, however, the same author has identified‡ this large tree with *B. occidentalis*, Hooker,§ not the small tree or half-shrub taken for *B. occidentalis* by Nuttall and other American authors, including Sargent, Silva, ix, 65, t. 453; and he concludes that the bark "is very different from that of the eastern tree, and it is probably best to consider it a species."

* Syme, English Botany, viii, 184.
‡ Sargent, Bot. Gaz., xxxi, 238 (1901).
† Sargent, Silva, ix, 59.
§ Fl. Bor.-Am., ii, 155 (1839).

The original material of *Betula occidentalis* came from the Strait of Juan de Fuca; and if we examine specimens from that region we shall find them matching in every character of pubescence, leaves and strobiles large forms of eastern *B. alba* (*B. papyrifera*), as already intimated by Professor Sargent.* Branches collected by Professor L. F. Henderson in 1888 on the Gulf of Georgia, essentially a continuation of the Strait of Juan de Fuca, are clearly *B. occidentalis*, as shown by a tracing at the Arnold Arboretum of the original Scouler specimen. These specimens from the Gulf of Georgia have some of the branchlets strongly hirsute with sordid hairs mixed with abundant resiniferous atoms, while other (perhaps older) branchlets appear quite glabrous. In the original description of *B. occidentalis*, Hooker emphasized the abundance of resin, though nothing was said of hairs upon the branchlets. This character, however, is extremely variable, as shown by a large suite of specimens from Washington and British Columbia; and, admitting this inconstancy in the amount of resin and pubescence, the Gulf of Georgia branches seem to the writer quite inseparable from many sheets representing *B. alba* (*B. papyrifera*) from different sections of America. In such characters as are shown in herbarium material they are identified with the following among other specimens: Almota Creek, Whitman Co., Washington (*Piper*, No. 3,570), very resiniferous but not hairy, thus matching the original description; Cascade Mts. and Sumass Prairie, lat. 49°, British Columbia (*Lyall*), the latter the type of *B. alba*, subsp. *occidentalis*, β, *commutata*, Regel, the branchlets resiniferous but not hairy, thus agreeing with Hooker's original description; Pend d'Oreille River, Washington (*Lyall*), branchlets quite as hairy as in the Gulf of Georgia tree; Hill City, South Dakota (*V. Bailey*, sheet No. 230,000, U. S. Nat. Herb.), branchlets hairy; Black Hills, South Dakota (*Rydberg*, No. 1,005), branchlets hairy; Queenstown Heights, Ontario (*Macoun*, Herb. Geol. Surv. Can., No. 23,636), branchlets resiniferous, hirsute at tips; Goat Island, Niagara Falls, New York (*Coville*, sheet No. 294,829, U. S. Nat. Herb.), branchlets puberulent; Bald Eagle Ridge, Center Co., Pennsylvania (*Porter*), branchlets as in Gulf of Georgia specimens; North Conway, New Hampshire (*Wm. Boott*), branchlets as in last; Mountain Rock, Ellsworth, Maine (*Fernald*), branchlets resiniferous, slightly hairy; Manuels, Newfoundland (*Robinson* and *Schrenk*, No. 139), branchlets as in last. Other specimens from the coastal region of Washington and British Columbia are quite like some eastern branches. Thus Lake and Hull's plant from Tukanon River, Washington, and Macoun's No. 23,639 from Vancouver, are inseparable from

*Silva, l. c., Bot. Gaz., l. c.

a Niagara specimen collected by Asa Gray; and Piper's No. 1,128 from Whatcom Co., Washington, cannot be distinguished from Lowrie's material from Bald Eagle Mt., Blair Co., Pennsylvania (sheet No. 149,835, U. S. Nat. Herb.), and the old specimen of Wm. Oakes's from Topsfield, Massachusetts, referred by Regel to *B. occidentalis*, var. *commutata*; and in their leaves these trees very closely approach a Canoe Birch growing at Oak Island, Revere, Massachusetts, and well-known to the local botanists from its lustrous brown bark. From herbarium specimens, then, there is no character by which to separate the northwestern *Betula occidentalis* from the eastern *B. alba* (*papyrifera*).

The important character upon which Professor Sargent lays stress in his recent note* is the color of the bark, which in the northwestern tree is usually brown. This character alone seems hardly sufficient to separate specifically the two trees, especially in view of such brown-barked trees in the East as that on Oak Island; a tree growing at the foot of Mountain Rock, Ellsworth, Maine (represented in the Gray Herbarium), with gray-brown bark strongly tinged with plum-color; and Robinson and Schrenk's No. 139, from Newfoundland, in which the old bark, though becoming pale, retains much of the brown which is often seen in young trees. Furthermore, it is worthy of note that the Pacific Coast tree is not thoroughly constant in its bark. The Henderson plant of 1888, from the Gulf of Georgia (essentially the type locality), was sent to the late Sereno Watson, who called it *B. occidentalis*. Subsequently, however, Professor Henderson, writing under date of December 9, 1897, of the difficulties in studying this group, said: "Just where *B. papyrifera* leaves off and *B. occidentalis* begins, I am, and always have been, at a loss to say." He then comments upon a tree which "is undoubtedly *B. papyrifera* in every respect," adding, "and I have no doubt that my number 1,712, from the shores of Lummi Island, Gulf of Georgia, sent Mr. Watson in '88, and referred by him to *B. occidentalis*, is the same thing." Thus it would seem that *Betula alba* (*papyrifera*) is not constant in its pale bark in the East, and that *B. occidentalis* of the Northwest may not always be distinguished by its dark bark.

The tendency of another dark-barked northwestern tree to become quite as pale as the eastern Canoe Birch will be noted in the discussion of a species soon to be considered; but in this connection it is worth while to note a tendency to darkening of color which has been observed in certain other northwestern plants. It is well known that many species of *Carex* growing in shade or in southern areas have pale or hyaline scales, while

* Bot. Gaz., l. c.

the same plants in exposed or alpine situations have the scales brown, chestnut, or even nearly black.* On the Pacific slope of North America, especially from the Cascade and Coast Ranges to the coast of Oregon, Washington, British Columbia and Alaska, this tendency is likewise very conspicuous. It is well shown in such plants as *Carex praticola*, Rydb., in the Vancouver Island form described as *C. pratensis*, var. *furva*, Bailey; *C. pennsylvanica*, in the variety *vespertina*, Bailey; *C. aurea*, in the Vancouver plant, and in Suksdorf's No. 35 from Falcon Valley, and F. Binn's material from Port Ludlow, Washington; *C. limosa*, in the variety *stygia*, Bailey; *C. filiformis*, var. *latifolia*, in the Vancouver plant, and Hall's No. 607 from Oregon, Suksdorf's No. 51 from Klikitat Co., Washington, and Geyer's No. 72 from Oregon; and *C. rostrata*, in the Vancouver plant, and Piper's No. 994 from Seattle, and Suksdorf's Nos. 55 and 56 from the Cascade Mts. of Washington. The same tendency has likewise been noted in *Eleocharis* and *Juncus*. Without attempting here a discussion of the conditions which tend to produce upon our northwest coast the darkening of scales or other chartaceous portions of plants, it may be suggested that the brown color ordinarily seen in the Canoe Birch of Vancouver and the coastal region of Washington and British Columbia is perhaps due to the same physiological cause.

Emphasis has likewise been laid† upon the great height of this northwestern tree as compared with the eastern *Betula alba* (*papyrifera*). Yet it is interesting to note that David Lyall (whose specimens from the Lower Frazer River are a close match for Hooker's original description and for the tracing of the Scouler specimen) specially commented upon the tree as "growing to the height of 60 or 70 feet,"‡ while Piper's Whitman County trees are much lower. Since the brown-barked *Betula occidentalis* differs, then, only in this somewhat inconstant color of the bark from the ordinarily pale-barked *B. alba*, and since it is often no taller than the eastern tree, it seems to the writer hardly worthy special recognition, and that the tree was well treated by Professor Sargent in the Silva as a local tendency of the white-barked tree.

Betula alba, var. *glutinosa*.

Besides the ordinary Canoe Birch and its brown-barked form of the Pacific slope, there are many tendencies of *Betula alba* in America which deserve special comment. A single tree

* See, for example, Boott, Ill. ii, 98, etc.; Holm, this Journal, 4th series, ii, 218; Fernald, Proc. Am. Acad., xxxvii, 500, 504.

† Sargent, Silva, l. c., Bot. Gaz., l. c. ‡ Lyall, Jour. Linn. Soc., vii, 134.

left standing, after the widespread devastation of forest fire, by the Wassataquoik River, near Mt. Katahdin, in Maine, is conspicuous on account of its pendulous "weeping" branches, small leaves and essentially straight peduncles. Though in habit this tree is strikingly like *B. pendula*, its leaves place it nearer *B. alba*. In fact, the material matches perfectly a specimen sent to the Gray Herbarium by Regel, from Finland, of *B. alba*, var. *glutinosa*, Trautv.,* the form *pendula*† figured by Reichenbach (Ic. Fl. Germ., xii, t. 625) as *B. pendula*, though not the species of Roth. This Wassataquoik Valley tree may be known as *Betula alba*, var. *glutinosa*, Trautv. This form (*B. glutinosa*, Wallr.‡) is treated by various European authors as a natural hybrid between *B. alba* (*pubescens*) and *B. pendula*,§ but the apparent absence from Maine of *B. pendula* renders this origin of the tree improbable.

Betula alba, var. **cordifolia.**

Another tree more common in the mountainous portions of New England than *Betula alba*, var. *glutinosa*, differs from the ordinary Canoe Birch only in its cordate-ovate leaves. In this character it is very constant, however, and seems to deserve the varietal recognition given it by Regel as *B. alba*, subsp. *papyrifera*, β, *cordifolia*,‖ (*B. cordifolia*, Regel, Mon. 28, t. 12, figs. 29–36). The species, *B. cordifolia*, was based upon one of de la Pylaie's specimens from Newfoundland, and in his later treatment of the tree Regel cited two sheets in the Gray Herbarium, one from Mt. Katahdin, Maine, the other from Lake Superior. The tree is common on the upper wooded slopes of Katahdin and other mountains of northern New England, becoming a dwarf shrub at their summits, where it has passed as *B. papyracea*, var. *minor*, Tuck. Tuckerman's original material and description, however, was of another form soon to be noted. The tree or shrub of the mountainous districts of New England, with cordate leaves, pubescent on the veins beneath, may be known as *Betula alba*, var. **cordifolia** (Regel). Its range is a broad one, from northern Labrador (*C. A. Kenaston*, sheet No. 25,240, U. S. Nat. Herb.) and Newfoundland to New Brunswick, Maine, the White Mountains, New Hampshire, Lake Superior, Iowa (*B. Fink*, No. 109), Alberta, British Columbia, Idaho, and Washington.

* Trautv. ex Regel, Mon. Bet. (1861), 20. † Regel, l. c., 23.
‡ Sched. Crit., 497 (1822).
§ See Koehne, Deutsch Dendr., 109; Guerke, l. c., 48.
‖ Regel in DC., l. c., 166.

Betula alba, var. **minor.**

The dwarf alpine shrub which was described by Tuckerman as *Betula papyracea*, var. *minor*,* is represented in the Gray Herbarium by material from Tuckerman himself. It is not, perhaps, the commonest dwarf Canoe Birch of the White Mountains, but is a form with the small elliptic- or truncate-ovate leaves strongly glutinous and quite without pubescence. From the comparatively narrow wings of the samaras in Tuckerman's specimens, Regel took the plant to be a form of *B. davurica*, Pallas, of eastern Asia, and upon the Tuckerman sheet he based his *B. davurica*, β, *americana*.† The shrub is, however, more properly a phase of *B. alba*, and it occurs likewise on the North Summit of Mt. Katahdin, where it sometimes has the leaves smaller firmer and more glutinous than on Mt. Washington; in Gaspé and in Labrador; and in the mountains of Saskatchewan, Assiniboia and Alberta, where it intergrades with *B. microphylla*. Though ordinarily distinguished from *B. alba*, var. *cordifolia*, by its elliptic- or truncate-ovate glabrous leaves, smaller erect strobiles, and smaller samaras, this second dwarf Canoe Birch shows tendencies to integrade with that form. In its most characteristic development this shrub of the New England mountains matches *B. tortuosa*, Ledebour,‡ described from the Altai Mts. of central Asia, where it had likewise been mistaken by Ledebour for *B. davurica* of Pallas. The range of *Betula tortuosa* has since been extended through northern Russia to Silesia, Finland, Lapland and Greenland, where it is sometimes treated as a species, but by Koehne and by Guerke as a form of *B. alba* (*B. pubescens*, var. *tortuosa* (Ledeb.) Koehne).§

If we compare specimens collected by the late Edwin Faxon at "Willis's Seat" on Mt. Washington, New Hampshire, and Altai material of *Betula tortuosa* sent to the Gray Herbarium from the Imperial Herbarium at St. Petersburg, we shall find the former differing only in its glabrous branchlets. This want of pubescence is, however, quite as conspicuous in a Lapland specimen from Regel of his *B. alba*, subsp. *tortuosa a genuina*. If, again, we compare the original sheet of Tuckerman's *B. papyrucea*, var. *minor* from the White Mountains with the plate of *B. tortuosa* in Flora Danica (xvii, t. 2918) we shall find them too close for ready separation. Specimens from Mt. Katahdin are, furthermore, quite inseparable from Rosenvinge's No. 160 from Greenland, distributed from the Botanical Museum of Copenhagen as *B. odorata*, var. *tortuosa* and represented by sheet No. 2,044 in the Herbarium of the Geological Survey of Canada; and various Mt. Washington speci-

* Tuck., this Journal, xlv, 31 (1843).
‡ Fl. Ross. iii. 652 (1849).
† Regel in DC., l. c., 175 (1864).
§ Deutsche Dendr. 109 (1893).

mens are practically identical with Rosenvinge's Nos. 174 and 210 from Greenland. This shrub or dwarf tree offers considerable variation in the outline and toothing of its leaves, but no more than does the same form abroad; and since the young branchlets and leaves are sometimes pubescent as in *B. alba* its treatment as a dwarf variety seems the wiser course, and the shrub may be known as *Betula alba*, var. **minor** (Tuckerman).

Betula alba, var. **carpatica.**

A shrub growing on Anticosti Island at the mouth of the St. Lawrence (*Macoun* in Herb. Geol. Surv. Can., No. 23,823) differs somewhat markedly from other American forms. It is nearest *Betula alba*, var. *minor*, but differs in its broadly rhombic leaves, mostly cuneate at base and permanently pubescent beneath, especially on the nerves. This shrub is undoubtedly the *B. borealis*, Spach* (*B. pumila*, γ *borealis*, Regel, Mon. Bet. 55, t. 13, figs. 38, 39), described from Newfoundland, and it is identified with Regel's description of *B. pubescens*, ζ *carpatica*† (*B. carpatica*, Waldst. and Kit. in Willd. Sp. iv, 464). The specimens, except in their more abundant pubescence (in this matching Regel's "folia subtus in venarum axillis saepe barbata"), are well matched by a Lapland sheet distributed by Regel as *B. pubescens*, var. *carpatica;* and they are equally well matched by a sheet distributed by Fries as *B. glutinosa.* This plant, *B. glutinosa* of Fries, not Wallroth, is treated by Guerke as identical with *B. carpatica.* The same form is well represented in Flora Danica (xvi, t. 2851) as *B. odorata*, var. *rhombifolia*, Lange, with *B. odorata*, var. *carpatica*, Lange (*B. carpatica*, Waldst. and Kit.) cited as a synonym. Guerke, however, does not identify *B. rhombifolia*, Tausch, with *B. carpatica*, and considering this doubt it is least confusing to call the plant *Betula alba* var. **carpatica** (Waldst. and Kit.). The same form occurs in the Herbarium of the Canadian Geological Survey from Banff, Alberta (*Sanson*, Nos. 22,298 and 22,444), though in its somewhat resiniferous branchlets the first cited specimen tends toward *B. microphylla*, Bunge. An old specimen collected by Dr. Richardson on the Franklin Expedition (sheet No. 23,628, Herb. Geol. Surv. Can.) is apparently the same.

Betula pendula.

Betula pendula, var. *japonica.*

Aside from *Betula papyrifera* and *B. occidentalis* the only birch of the section *Albae* generally recognized in America until within three years has been *B. populifolia*, a purely

* Spach, Ann. Sci. Nat., ser. 2, xv, 196 (1841). † Regel in DC., l. c. 168.

American species quickly distinguished by its comparatively low stature and southern range, its chalky white or gray-flecked close and scarcely defoliating bark, its glossy extremely caudate-attenuate deltoid leaves, its compact grayish brown fruiting strobiles averaging 3^{cm} long and 6^{mm} thick, and the samara rarely 3·5^{mm} broad. Very recently, however, three trees have been described from northwestern America as unique American species: *Betula kenaica*, W. H. Evans,* from Alaska; *B. alaskana*, Sargent,† from Saskatchewan and Alaska; and *B. fontinalis*, Sargent,† the Rocky Mountain half-shrub which has there passed as *B. occidentalis*.

The writer has not seen the original material of *B. kenaica*, but a large suite of specimens collected by Messrs. Coville and Kearney in the type region, on the Harriman Alaska Expedition, has been placed in his hands by Mr. Coville. This series of 15 sheets in the United States National Herbarium is supplemented by very important notes by Mr. Coville on the color of the bark, etc.

The first specimens cited by Professor Sargent for his *Betula alaskana* are one of Bourgeau's collected on the Saskatchewan during the Palliser Expedition, and Macoun's material from Prince Albert, Saskatchewan, collected in July, 1896 (not 1876 as originally published). The other material came from Alaska and the tree is said to be "the 'canoe birch' of all travellers in Alaska, and it is the common birch tree of the Yukon Valley." The Bourgeau plant, the first specimen cited by Professor Sargent and consequently (for want of any specially indicated specimen) to be regarded as the type, is in the Gray Herbarium. This plant was labelled by Regel and was included by him in the Prodromus as *B. alba*, subsp. *verrucosa* δ *resinifera*, a form otherwise known to him from Amur, near Udskoi (latitude 55°) on the Okhotsk Sea, and from the neighboring province, Transbaikalia. *B. verrucosa*, var. *resinifera* was distinguished by Regel from the typical *B. verrucosa* by the densely resiniferous branchlets, a character very conspicuous in the Bourgeau specimen, but less marked in Macoun's Saskatchewan material. And although in *B. kenaica* the twigs were originally described as "not resin-dotted," later collections show the character to be inconstant and that the twigs are sometimes quite as glandular or resiniferous as in the Bourgeau specimen of *A. alaskana*; and furthermore, *B. alaskana* has the twigs only "more or *less* verrucose with conspicuous resinous glands," so that little stress should be laid upon this character.

A comparison of the original descriptions of *Betula kenaica* and *B. alaskana* shows no point by which they can be sep-

* Bot. Gaz. xxvii, 481 (1899).

† Bot. Gaz. xxxi, 236, 239 (1901).

arated. Both are trees commonly with red-brown or brown-gray bark, both have the twigs smooth or resiniferous, the leaves dark green above, paler beneath and ultimately quite glabrous. The fruiting catkins are described in practically the same terms. *B. kenaica* is common in the region of Kenai Peninsula and Kadiac Island; while *B. alaskana* is characterized as "the 'canoe birch' of all travellers in Alaska," and the range given includes "the Alaskan coast on the shores of Lynn Canal . . . ; and westward." Since Lynn Canal lies on the coast in the same latitude as Kenai Peninsula and scarcely 500 miles to the eastward, the general range covered by Professor Sargent's "westward" may well include the type region of *Betula kenaica.*

A comparison of specimens of *Betula kenaica* and *B. alaskana* likewise fails to reveal any distinctions. For instance, Coville and Kearney's No. 2,423 of *B. kenaica* (sheet No. 373,620 in the U. S. Nat Herb.) is quite inseparable from Macoun's Prince Albert material (No. 12,952*a*, Herb. Geol. Surv. Can.), one of the original specimens cited for *B. alaskana;* and neither of these specimens can be separated in habit, twigs, leaves or pubescence from No. 20,327 of the Canadian Geological Survey Herbarium, material collected by R. G. McConnell near Dawson City on the Yukon, where *B. alaskana* is said to abound. Furthermore, although the Bourgeau specimen of *B. verrucosa*, var. *resinifera*, the first cited specimen of *B. alaskana*, is young, its leaf-outline and very resiniferous twigs seem quite identical with those of Coville and Kearney's No. 2,412 of *B. kenaica* (sheet No. 373,618, U. S. Nat. Herb.). There is, then, no question that *Betula alaskana* described in 1901 is identical with *B. kenaica*, published in 1899.

Both Mr. Evans and Professor Sargent had their species compared at St. Petersburg, before publication, with Siberian material; and it is certainly very unfortunate that these comparisons were not more satisfactorily made, since very many sheets in the Gray Herbarium, as well as the United States National Herbarium, show what appear to be identical branches collected in Asia over a wide range of country,—from Kamtschatka to northwestern Siberia (Yenisei River), south to Japan, Mandschuria, Mongolia and Sungaria. This Asian tree was treated by Regel in the Prodromus as *Betula alba*, subsp. *mandshurica* and *latifolia*, while the more strongly resiniferous were included in his subsp. *verrucosa*, δ *resinifera.* The form treated by Regel as subspecies *latifolia* had, however, been described by Siebold* in 1830 as *Betula japonica.*

* Verh. Batav. Gen., xii (1830), 25.

In Asia as in northwestern America the abundance of resin on the branchlets seems to vary without any accompanying change in leaf-outline or other character perceptible in the specimens; and by comparison with well authenticated Asian specimens of *Betula verrucosa*, Ehrh. (*B. pendula*, Roth), *B. mandshurica*, Regel, and *B. latifolia* (*B. japonica*) with its vars. *Tauschii* and *kamtschatica*, essentially all the available material of the American *B. kenaica* (including *B. alaskana*) can be exactly matched. Thus such specimens as Coville and Kearney's Nos. 1,408, 1,422, and 2,425 of *B. kenaica* (Nos. 373,608, 373,609, 373,622, U. S. Nat. Herb.) and an old sheet in the National Herbarium from Fort Simpson (Mackenzie District) are good matches for Japanese material collected by Maximowicz and distributed as *B. alba*, subsp. *latifolia a Tauschii*, Regel (represented in the Gray Herb. and by sheet No. 25,341 in the U. S. Nat. Herb.). These specimens also match too closely the original description and figure of var. *Tauschii*, Regel.* Further material of var. *Tauschii* collected by Maximowicz in Mandschuria and distributed from the Imperial Herbarium at St. Petersburg (represented in Gray Herb. and by sheet No. 25,345, U. S. Nat. Herb.) has the leaves more coarsely and irregularly toothed than the specimens previously cited, but in this it is not distinguishable from Coville and Kearney's No. 2,412 of *B. kenaica* (sheets Nos. 373,618, 373,619, U. S. Nat. Herb.) nor from the Bourgean specimen, type of *B. alaskana;* nor does this foliage differ from that of specimens collected by Korjhinsky at Blagovyeschensk, Amur (represented in Gray Herb. and by sheet No. 273,721 in U. S. Nat. Herb.). Furthermore, these specimens cannot be separated by any apparent character from Kamtschatkan material sent to the Gray Herbarium by Regel as his *B. latifolia*, var. *kamtschatica*, and they are quite like his original figure of that variety;† while Macoun's Saskatchewan specimen (No. 12,952*a*) and McConnell's Dawson specimen (No. 20,327) of *B. alaskana*, and Coville and Kearney's Nos. 1,442, 1,444, 1,445, and 1,626 of *B. kenaica* (sheets Nos. 373,610, 373,611, 373,612, 373,616, U. S. Nat. Herb.) are quite as inseparable from Regel's original description and figure of *B. alba*, subsp. *mandshurica*.‡ It is thus very evident that *Betula kenaica* and *B. alaskana* cannot be treated as local American trees, but that they are quite identical with the well-known *B. pendula* or with the Asian tree which was described by Siebold in 1830 as *B. japonica*, and figured in its various forms by Regel in 1865.

* Bull. Soc. Imp. Nat. Mosc., 1865, 399, t. 7, figs. 11–14 (repr. Bemerkungen über die Gattungen Betula und Alnus (1866) 12, t. 7, figs. 11–14).

† Bull. Soc. Imp. Nat. Mosc., l. c., figs. 16–20.

‡ Bull. Soc. Imp. Nat. Mosc., l. c., fig. 15.

This Asian tree, which presents indiscriminate variation in the size and toothing of its leaves and the abundance of resin on its branches, was treated by Miquel* as a variety of the Eurasian *Betula alba*; while by Rehder it is more properly considered a variety of the subspecies *B. pendula* (*B. verrucosa*). This disposition of the tree seems most advisable, since typical *B. pendula* crosses northern Asia and is distinguished from the trees which Siebold called *B. japonica* and Regel called *B. latifolia* only by an inconstant tendency of the leaves to be more cuneate at base. The form of the tree with broad leaves rounded or truncate at base, common in northern Asia, and including much of *B. kenaica* and *B. alaskana*, should be known, then, as *Betula pendula*, Roth, var. *japonica* (Siebold), Rehder in Bailey Cyc. Am. Hort. i, 159.

Reference has been made to the tendency of *Betula alba* to develop brown bark when it occurs upon the northwest coast of America. Similar reddish or brown bark likewise ordinarily distinguishes the northwestern tree which has been called *B. kenaica* (*B. alaskana*) from the true *B. pendula*. But this is not a sufficiently constant character to separate it specifically from the Asian specimens which so closely match it in every detail shown in the herbarium. The writer has been unable to find any clear statement that the bark of *B. pendula*, var. *japonica*, is either white or brown. Bourgeau, however, who had previously remarked upon the abundance of *Betula papyrifera* on Ile Royale, Lake Superior,† and who was consequently familiar with the ordinary white-barked tree, referred the Saskatchewan tree without question to that species;‡ and Macoun referred his Prince Albert tree without comment to *B. papyrifera*. The fact that these acute collectors of the first mentioned specimens of *B. alaskana* saw in their Saskatchewan trees only the white-barked *B. papyrifera* is sufficient evidence that the brown bark of *B. alaskana* is not a character to be confidently relied upon. Furthermore, Mr. Coville writes of *B. kenaica* under date of March 12, 1901: "In certain individual trees, however, and perhaps on exposure to certain climatic conditions the layers of the bark separate and the bark turns white as in *papyrifera*. This factor has made it difficult for the collectors who have observed the tree to tell whether in upper Cook's Inlet there is a white-barked birch distinguishable from *kenaica*." Sheets Nos. 373,611, 373,619, and 373,620 in the United States National Herbarium show strips of lichen-covered bark of *B. kenaica* no darker

* Miquel, Ann. Bot. Mus. Lugd. Bat. ii, 136.

† Bourgeau in letter to Sir Wm. Hooker, Palliser, Rep. Brit. N. A. Expl. Exped. 247.

‡ Bourgeau, l. c. 249; see also Hooker, ibid., 260; Gray, ibid., 263; Sullivan, ibid., 85, etc.

than is occasionally seen in *B. alba* (*B. papyrifera*) in the Northeast and already mentioned in the discussion of *B. occidentalis*. The color of the bark, then, furnishes no satisfactory reason to separate *Betula kenaica* from the Asian *B. pendula*, var. *japonica*.

Betula pendula (typical).

The broad-leaved var. *japonica* is not the only form of *Betula pendula* which crosses from Europe and Asia into North America. As already noted, the typical European *B. pendula* with leaves cuneate at base extends across northern Asia. Some of the specimens which have been referred to *B. alaskana* are quite inseparable in their leaves, branches, and strobiles from European specimens; and, furthermore, this characteristic European form extends southward and eastward in America to western Illinois, the Great Lakes, and the St. Lawrence Valley. Sheet No. 351,017 of the United States National Herbarium, collected as *B. populifolia* in woods at Warren, Illinois, by L. M. Umbach, is not distinguishable from sheet No. 25,340 from Sungaria in central Asia, nor from material in the Gray Herbarium collected in Sweden (*Blomberg*, No. 1,691). Sheet No. 261,119 of the U. S. National Herbarium, collected by Professor James Fowler in Ontario as *B. populifolia*, has the strobiles and leaves of *B. pendula* and it cannot be separated from material in the Gray Herbarium from Christiania, Norway (*Blytt*), and from St. Petersburg, Russia (*Regel*). A sheet in the Herbarium of the Geological Survey of Canada (No. 12,950), collected in the Province of Quebec as *B. populifolia* by W. Scott, is quite identical with sheet No. 149,801 of the U. S. Nat. Herb. from Savoy. Various other leaf-specimens from Quebec, Manitoba, and other regions of temperate North America are probably *B. pendula*, but without fruit it is at present unwise so to refer them. The American specimens cited were gathered as the endemic *Betula populifolia*, at least one of them in "woods"; and since undoubted *B. pendula* is found from the Saskatchewan Plains northward, there seems little question that the European tree, crossing Asia, is truly indigenous likewise in the northeastern sections of America, just as are *Coptis trifolia*, *Drosera rotundifolia*, *Viburnum Opulus*, *Lysimachia thyrsiflora*, and many other well known species* which occur in northern Europe, central and northern Asia, Japan, northwestern America, and northeastern America.

* Among them *Caltha palustris*, *Viola Selkirkii*, *Parnassia palustris*, *Potentilla palustris*, *Circaea alpina*, *Pyrola minor*, *Moneses grandiflora*, *Menyanthes trifoliata*, *Rumex persicarioides*, *Allium Schoenoprasum*, *Juncus effusus*, *Eriophorum gracile*, *Carex filiformis*, *Hierochloe borealis*, etc., etc. See Gray, Mem. Am. Acad., n. s., vi, 377–499; and Extract "Flora of Japan" in Sci. Pap. of A. Gray, selected by C. S. Sargent, ii, 124–141.

Betula microphylla.

Professor Sargent has recently referred* to the fact that the writer identifies the common brown-barked tree or half-shrub of the Rocky Mountains with Bunge's *Betula microphylla* described from the Altai of central Asia. Professor Sargent, however, was unwilling to identify the American tree with Bunge's species, and he accordingly proposed for it the new name *B. fontinalis*. But a further comparison of *B. fontinalis* and an authentic branch from the Altai of Bunge's species sent from the Imperial Herbarium of St. Petersburg to the Gray Herbarium, some of the original Tyan Shan material of Regel's *B. alba*, subsp. *soongorica*† in the Gray Herbarium and in the United States National Herbarium, the figures of Regel's *B. fruticosa*, var. *cuneifolia*,‡ and lastly the original detailed full-page description by Bunge of his *B. microphylla*,§ has more firmly convinced the writer that all three of these trees described from the Altai and the Tyan Shan ranges are one species, *B. microphylla*, Bunge; and that this species differs from *B. rhombifolia*, Nutt. (*B. occidentalis*, Nutt. and of many other authors, not Hook. *B. fontinalis*, Sargent) only in growing among the mountains of central Asia rather than among those of northwestern America.

A comparison of Bunge's original description of *Betula microphylla* with Nuttall's description of his *B. occidentalis*,‖ the tree subsequently called by Sargent *B. fontinalis*, shows no definite character of leaves, strobiles, samaras, nor twigs upon which the two may be separated; and Bunge's words, "epidermide trunci flavescente neque alba, primo intuito distinctissima,"¶ are certainly not inapplicable to the small tree of northwestern America described in the Botany of California "with close dark-colored bark (at length light brown)."** Furthermore, if we compare with the branch of *B. microphylla* sent from St. Petersburg to the Gray Herbarium the original specimen of Nuttall's *B. rhombifolia*†† (preserved in the Gray Herbarium and referred by Sargent to *B. fontinalis*), and such specimens as Macoun's from the North Saskatchewan and Dawson's from the Columbia River (Herb. Geol. Surv. Can., Nos. 23,620, and 23,624) or F. W. Anderson's material from McCarthey Mts., Montana (U. S. Nat. Herb. No. 25,261), we shall be perplexed to make out points of distinction. If we also compare with some of the original material of Regel's *B. alba*, subsp. *soongorica*, *β microphylla* from 5,000 ft. in

* Bot. Gaz. xxxi, 239.
† Bull. Soc. Imp. Nat. Mosc. (1868) vi—repr. Enun. Pl. Semenow. (1869) 99.
‡ Regel, Mon. Bet. (1861) 35, t. 7, figs. 16–23.
§ St. Pétersb. Mém. Savans Étrang. ii (1835) 606—reprint, Fl. Alt. Suppl. 84.
‖ Nutt., Sylva, i, 22, t. 7 (1842).
¶ Bunge, l. c.
** Watson, Bot. Cal. ii, 79.
†† Nutt., l. c. 24, t. 8.

the Tyan-Shan Mountains as represented in the Gray Herbarium and by sheet No. 25,339 in the U. S. National Herbarium, such specimens as V. Bailey's No. 5 from South Dakota, Coville and Leiberg's No. 81 from Nevada, and R. S. William's No. 404 from Montana (sheets Nos. 229,983, 275,933, and 290,087, U. S. Nat. Herb.); or Macoun's Devil's Lake plant, Dawson's South Kootenai Pass Plant, and Macoun's Crow Nest Pass Plant (Nos. 2,050, 23,623, and 24,368, Herb. Geol. Surv. Can.); or Lake and Hull's No. 790 from Washington, Rydberg and Bessey's No. 3,928 from Montana, Rydberg's No. 1,006 from the Black Hills, and A. Nelson's No. 1,647 from Wyoming, we shall be further perplexed in separating the American species from the Asian. Similar comparisons of American specimens with the figures of *B. fruticosa*, var. *cuneifolia* (which by Regel was identified with *B. microphylla*), lead to the same result. In view of this evidence and the essentially identical descriptions of Nuttall and Bunge, the writer is still unable to see in *Betula fontinalis*, Sargent (*B. occidentalis*, Nutt., not Hook. *B. rhombifolia*, Nutt., not Tausch) anything but *B. microphylla*, Bunge, of the mountains of central Asia.

§ **Nanae.** Shrubs: wings of the samaras narrower than, or very rarely as broad as the achenes.

The Dwarf Birches like the Canoe Birches present such tendencies to intergradation that it is difficult to draw clear specific lines between them. Yet in America three fairly marked species or centers of variation can be distinguished. These are *Betula pumila*, L., with the young shoots normally pubescent with long soft hairs, and quite glandless, but in an extreme form with glands or resiniferous atoms mixed with the long pubescence; *B. glandulosa*, Michx., with the young shoots glandular or resiniferous, at most puberulent with close short hairs; and *B. nana*, L., a tiny shrub with the young shoots puberulent or finely pubescent, but not glandular. In its typical form confined to arctic and alpine regions of Greenland, Europe and Asia, *B. nana* is represented in America by

Betula nana, var. Michauxii.

A very dwarf birch with cinereous-puberulent glandless branches and tiny suborbicular or flabelliform leaves has been collected at various points in Newfoundland, Labrador, and the Hudson Bay region, and has been referred to *Betula nana*, L., or its var. *flabellifolia*, Hook. An examination of this material shows that the strobiles are made up of simple oblong scales, instead of the deeply three-lobed scales characteristic of *B. nana* and most other species of the genus.

This dwarf shrub of Newfoundland and Labrador is without question *Betula Michauxii*, Spach,* based upon the *B. nana* of Michaux, not L., and made by Spach the type of his section *Apterocaryon*. Subsequently the plant was raised to generic rank by Opiz,† and called *Apterocaryon Michauxii*; while, on the other hand, Regel in his first Monograph treated‡ the plant as a variety of *B. nana*, though he later recognized§ it as distinct. Habitally the plant is quite inseparable from the European *B. nana*; and since sheet No. 334,540 of the United States National Herbarium, from Nugsuak Peninsula in Greenland, shows strobiles with simple and variously divided scales, it seems that Regel's earlier treatment of the plant was wiser and that the Newfoundland and Labrador representative of *Betula nana* is var. *Michauxii* (Spach) Regel.

Betula pumila.

In its normal form *Betula pumila, L.*‖ has the leaves and branchlets quite glandless and in their youngest stages densely pubescent with silky hairs. The shrub, however, passes imperceptibly into a state (var. *glabrescens*, Regel) in which the branchlets and leaves are quite glabrous. This tendency is common, but apparently not of such constancy as to merit special recognition. It is interesting to find, however, that the specimens which represent this tendency are inseparable from *B. alpestris*, Fries,¶ of Greenland, Iceland, Scandinavia and north Germany, an identity which was at least suspected by Regel.** Such specimens in the Herbarium of the Geological Survey of Canada as Macoun's No. 23,840 from Anticosti and Waghorne's No. 23,821[b] from Labrador are quite inseparable from sheet No. 149,806 in the U. S. Nat. Herb. of *B. alpestris* from the Dovre Mts., Norway (*Ahlberg*) and a sheet in the Gray Herbarium from Lapland (*Andersson*), except in the length of the petiole. This character, however, is very inconstant and it seems to the writer an insufficient point on which to keep apart two plants which are otherwise inseparable. Nor are the extreme American plants otherwise different from the plate representing *B. fruticosa*, var. *humilis*, Reichenbach (Ic. Fl. Germ. xii, fig. 1280) and referred by Guerke to *B. alpestris*, and the plate of *B. alpestris* in Flora Danica (Suppl. t. 37). The name *B. pumila*, however, long antedates *B. alpestris*, Fries, and it should now be applied to the shrub of northern Europe as well as America. The true *Betula pumila* occurs in swamps from Labrador and Newfoundland west-

* Ann. Sc. Nat., ser. 2, xv, 195.
‡ Regel, Mon. Bet. (1861) 45.
§ Regel in DC. Prodr. xvi, part 2 (1864), 171.
¶ Summ. Veg. Scand. i, 212 (1846).
† Lotos, v (1855), 258.
‖ Mant. 124 (1767).
** Regel in DC., l. c. 173.

ward, and locally south to Morris Co., New Jersey, Champaign Co., Ohio, Lake Co., Indiana and McHenry Co., Illinois, in Greenland, northern Europe and Siberia. The leaves vary much in outline and in the degree of permanence of the pubescence; and the samaras in the breadth of the wings and achenes. Narrowly obovate and orbicular leaves are often found upon the same shrub, so that species or varieties based upon these characters (as *B. Grayi*, Regel, Bull. Soc. Imp. Nat. Mosc. xxxviii, 406, t. 6, figs. 9–13) have little value.

Betula pumila, var. *glandulifera*.

In the Great Lake region, however, and from there northward and westward, where *Betula pumila* meets *B. glandulosa*, it presents a perplexing form. In its long pubescence (when well developed) the shrub seems to be *B. pumila*, but mixed with the pubescence and sometimes upon the leaves are the characteristic glandular atoms of *B. glandulosa*. Ordinarily, though, the shrub is readily distinguished from the latter species by the longer pubescence of the young shoots. This intermediate and transitional form, *Betula pumila*, var. *glandulifera*, Regel in DC. l. c., occurs from western Ontario and Michigan to Minnesota, Saskatchewan and British Columbia, south to Idaho and Oregon.

Betula glandulosa.

*Betula glandulosa** presents two variations which in their extreme developments appear very distinct, but which again so mingle their characters as to be quite inseparable. Typical *B. glandulosa* is an upright shrub sometimes several feet high, but in exposed situations it becomes dwarfed and widespreading. In the typical form of the species the leaves are obovate, but occasionally on these shrubs orbicular or reniform leaves are found. This shrub with obovate leaves is most common in the interior of North America, from the Yukon and Mackenzie Rivers to Hudson Straits, south in the mountains to northern California, Utah, Colorado, and South Dakota; across the plains to Manitoba and Lake Superior; and through Labrador and locally to the higher mountains of northern New England. It is also in Greenland, Kamtschatka and the Altai Mountains.

On the eastern mountains (Albert, Katahdin and Washington), in Labrador, and in the Altai the shrub passes imperceptibly to a form with orbicular or reniform leaves, var. *rotundifolia*, Regel† (*Betula rotundifolia*, Spach‡); but on

* Michx., Fl. Bor.-Am. ii, 180 (1803). † Regel in DC., l. c. 172 (1864).
‡ Spach, l. c. 194 (1841).

the coast of Alaska, the islands of Behring Sea, and adjacent Kamtschatka this depressed form with small orbicular or reniform leaves retains its characteristics in a marked degree, and were the plant known only from that district it would stand as an undoubted species.

Mr. Coville has called the attention of the writer to a shrub four to six feet high which is associated with the depressed *Betula glandulosa*, var. *rotundifolia*, and the Cook's Inlet tree which is identified with *B. pendula*, var. *japonica*. This intermediate shrub is well represented in the National Herbarium, and it is possible, as Mr. Coville suggests, that it is of hybrid origin, since similar hybrids of trees and dwarf shrubs have before been noted.* The material presents a strong superficial resemblance to Greenland specimens of *B. alba*, var. *minor*, although the strongly resiniferous branchlets hardly place it with that shrub.

In conclusion, it should be emphasized that the specific lines in *Betula*, as in *Alnus*, *Quercus* and *Salix*, are often too vague. It is quite possible to trace by a series of specimens a direct connection between the dwarf *Betula nana* or *B. glandulosa* and the tall *B. alba*. Thus *B. nana* in its larger development is separated with difficulty from the Scandinavian *B. alpestris*. This shrub, in turn, is quite like glabrate states of the American *B. pumila*, which, through its var. *glandulifera*, passes to *B. glandulosa*, the larger developments of which pass in the Cascade Mts. to *B. microphylla*, and in the Saskatchewan region to *B. alba*, var. *minor*. The latter shrub is often inseparable on the New England mountains from *B. alba*, var. *cordifolia*, which on the lower slopes becomes a large tree and passes gradually to the broad-leaved form figured by Michaux as *B. papyracea*. A very similar series is readily made to include *B. pendula* and *B. humilis*. But since it is obviously impracticable to regard all these forms as one species, it seems wiser to recognize the more marked centers of variation as species which are admitted to pass by exceptional tendencies to other forms ordinarily distinguished by marked characteristics.

The American representatives of § *Costatae*, *Betula nigra*, *B. lenta*, and *B. lutea*, are represented by related species in Asia, but none of these trees are of very boreal range, and they appear well distinguished as endemic species.

* *B. pubescens* [*alba*] × *humilis*, Warnst. Verh. Bot. Ver. Brandenb. xi, 129 (1870).

B. nana × *verrucosa* [*pendula*], Sael. Medd. Soc. Faun. et. Fl. Fenn. xiii, 256 (1886).

B. nana × *pubescens* [*alba*], Koehne, Deutsche Dendr. 112 (1893).

B. pumila × *lenta*, Jack, Gard. and For. viii, 243, fig. 36 (1895).

The American forms of §§ *Albae* and *Nanae* now recognized by the writer and discussed in the preceding notes may be briefly enumerated as follows:

B. ALBA, L. Sp. ii, 982 (1753); Roth, Fl. Germ. i, 404. *B. papyrifera*, Marshall, Arbust. Am. 19 (1785). *B. papyracea*, Ait. Hort. Kew. iii, 337 (1789). *B. pubescens*, Ehrh. Beitr. v, 160, vi, 98 (1790–91). *B. odorata*, Bechst. Diana, i, 74 (1797).—NEWFOUNDLAND to ALASKA, south to PENNSYLVANIA, INDIANA, NEBRASKA, WYOMING, IDAHO and WASHINGTON; passing on the Pacific coast to the dark-barked forma *occidentalis* (*B. occidentalis*, Hook. Fl. Bor.-Am. ii, 155 (1839)); ICELAND, northern EUROPE and ASIA, south in the mountains to northern SPAIN, ITALY, etc. (Pl. V, figs. 1–6.)

B. ALBA, var. GLUTINOSA, Trautv. ex Regel, Mon. Bet. 20 (1861). *B. glutinosa*, Wallr. Sched. Crit. 497 (1822). *B. pendula*, Reichenb. Ic. Fl. Germ. xii, t. 625, not Roth.—Valley of Wassataquoik River, MAINE; SWEDEN, FINLAND, GERMANY, SWITZERLAND, AUSTRIA.

B. ALBA, var. CORDIFOLIA. *B. cordifolia*, Regel, Mon. Bet. 28, t. 12, figs. 29–36 (1861). *B. alba*, subsp. *papyrifera*, β, *cordifolia*, Regel in DC. Prodr., xvi, pt. i, 166 (1864). *B. papyrifera*, var. *minor*, Wats. and Coult. in Gray, Man. ed. 6, 472 (1889), in part, not *B. papyracea* var. *minor*, Tuck.—LABRADOR and NEWFOUNDLAND to NEW BRUNSWICK, MAINE, NEW HAMPSHIRE, LAKE SUPERIOR, IOWA, ALBERTA, BRITISH COLUMBIA, IDAHO, and WASHINGTON.

B. ALBA, var. MINOR. *B. davurica*, Ledeb., Fl. Alt. iv, 245 (1833), not Pallas. *B. papyracea*, var. *minor*, Tuckerman, this Journal, xlv, 31 (1843). *B. tortuosa*, Ledeb., Fl. Ross. iii, 652 (1849). *B. odorata*, var. *alpigena*, Blytt, Norg. Fl. 402 (1861). *B. alba*, subsp. *tortuosa*, Regel, in DC., l. c. 168 (1864). *B. davurica*, β, *americana*, Regel, l. c. 175 (1864). *B. odorata*, var. *tortuosa*, Lange, Fl. Dan. xvii, 10, t. 2918 (1877). *B. papyrifera*, var. *minor*, Wats. and Coult. l. c., in part. *B. pubescens*, var. *tortuosa*, Koehne, Deutsche Dendr. 109 (1893).—LABRADOR to the mountains of MAINE, NEW HAMPSHIRE and VERMONT; mountains of SASKATCHEWAN, ASSINIBOIA, and ALBERTA; GREENLAND, ICELAND, LAPLAND, FINLAND, northern GERMANY, ALTAI MTS.; dwarf forms from ALASKA resemble this variety, but have the strongly resiniferous branchlets of *B. glandulosa* and *B. pendula*. (Pl. V, figs. 7–12.)

BETULA ALBA, var. CARPATICA. *B. carpatica*, Wald. and Kit. in Willd. Sp. iv, 464 (1805). *B. borealis*, Spach, Ann. Sci. Nat., ser. 2, xv, 196 (1841). *B. glutinosa*, Fries, Summ. Veg. Scand., 212 (1846), not Wallr. *B. pumila*, γ, *borealis*, Regel, Mon. Bet. 55, t. 13, figs. 38, 39 (1861). *B. alba*, subsp.

pubescens, ζ *carpatica*, Regel in DC., l. c. 168 (1864). *B. odorata*, var. *carpatica*, Lange, Haandb., ed. 3, 708 (1864). *B. odorata*, var. *rhombifolia*, Lange, Fl. Dan., xvi, t. 2851 (1871).—Anticosti, Quebec; Alberta; and northward; Scandinavia to Germany, Austria and Russia. (Pl. V, figs. 13–14.)

B. pendula, Roth, Fl. Germ. i, 405 (1788). *B. verrucosa*, Ehrh., Beitr. vi, 98 (1791). *B. alba*, var. *verrucosa*, Wallr., Sched. Crit., 495 (1822). *B. alba*, var. *vulgaris*, Spach, l. c. 186 (1841). *B. odorata*, Reichenb., Ic. Fl. Germ., xii, fig. 1288 (1850), not Bechst. *B. gummifera*, Bertol., Fl. It., x, 229 (1854). *B. alba*, subsp. *verrucosa*, a, *vulgaris* and δ, *resinifera* (in part), Regel in DC., l. c. 163, 164 (1864). *B. kenaica*, W. H. Evans, Bot. Gaz., xxvii, 481 (1899), in part. *B. alaskana*, Sargent, Bot. Gaz., xxxi, 236 (1901), mostly.—Quebec to Illinois, Alberta, Mackenzie and Alaska; Europe and Asia, widely distributed. (Pl. V, figs. 15–18; Pl. VI, figs. 19–22.)

B. pendula, var. japonica, Rehder in Bailey, Cyc. Am. Hort., i, 159 (1900). *B. japonica*, Siebold, Verh. Batav. Gen. xii, 25 (1830). *B. latifolia*, Tausch, Fl. Ratisb., 751 (1838). *B. alba*, subsp. *verrucosa*, δ *resinifera*, Regel in DC., l. c. 164, in part; subsp. *mandshurica* and *latifolia*, Regel, l. c. 165 (1864). *B. kenaica*, W. H. Evans, l. c. (1899), mostly. *B. alaskana*, Sargent, l. c. (1901), in part.—Sungaria to Japan, north to the Yenisei River, Siberia, and Kamtschatka; east to Peel River and Fort Simpson, Mackenzie, and along the Alaska coast; and apparently on the coast of Washington Co., Maine (trees sterile). (Pl. VI, figs. 23, 24.)

B. populifolia, Marshall, Arbust. Am., 19 (1785). *B. alba*, var. *populifolia*, Spach, Ann. Sci. Nat., ser. 2, xv, 187 (1841). *B. alba*, subsp. *populifolia*, Regel, in DC., l. c. 164 (1864).—Prince Edward Island to central Maine, southwestern Quebec, and western New York, south mostly on the coastal plain to Delaware.

B. microphylla, Bunge, St. Pétersb. Mém. Savans Étrang., ii (1835), 606--reprint, Fl. Alt. Suppl. 84. *B. occidentalis*, Nutt., Sylva, i, 22, t. 7 (1842), not Hook. *B. rhombifolia*, Nutt., l. c. 24, t. 8, not Tausch. *B. fruticosa*, var. *cuneifolia*, Regel, Mon. Bet. (1861) 35, t. 7, figs. 16–23. *B. alba*. subsp. *soongorica*, Regel, Bull. Soc. Imp. Nat. Mosc., vi, (1868)—reprint, Enum. Pl. Semenow (1869) 99. *B. fontinalis*, Sargent, Bot. Gaz. xxxi, 23 (1901).--In the mountains from Alaska to northern California, Saskatchewan, South Dakota, and New Mexico; Altai and Tyan Shan Mts., central Asia. (Pl. VI, figs. 25–32.)

B. nana, L., var. Michauxii, Regel, Mon. Bet. (1861), 45. *B. Michauxii*, Spach, l. c. 195 (1841). *Apterocaryon Michauxii*, Opiz, Lotos, v (1855), 258.—Hudson Bay, Labrador and Newfoundland. (Pl. VI, figs. 47, 48.)

B. PUMILA, L., Mant. 124 (1767). *B. alpestris*, Fries, Summ. Veg. Scand., i, 212 (1846). *B. fruticosa*, var. *humilis*, Reichenb. Ic. Fl. Germ., xii, fig. 1280 (1850). *B. nana* var. *alpestris*, Regel, Mon. Bet. 45 (1861). *B. Grayi*, Regel, Bull. Soc. Imp. Nat. Mosc., xxxviii, 406, t. 6, figs. 9–13 (1865).—LABRADOR and NEWFOUNDLAND to ONTARIO, south to Morris Co., NEW JERSEY, Champaign Co., OHIO, Lake Co., INDIANA, and McHenry Co., ILLINOIS; GREENLAND, SCANDINAVIA, northern GERMANY, FINLAND, LAPLAND, RUSSIA, SIBERIA. (Pl. VI, figs. 33–38.)

B. PUMILA, var. GLANDULIFERA, Regel in DC., l. c. 173 (1864).—ONTARIO and MICHIGAN to MINNESOTA, SASKATCHEWAN and BRITISH COLUMBIA, south in the mountains to IDAHO and OREGON.

B. GLANDULOSA, Michx., Fl. Bor.-Am., ii, 180 (1803). *B. nana* of various American authors, not L. *B. Littelliana*, Tuckerman, this Journal, xlv, 30 (1843).—GREENLAND and HUDSON STRAITS to KAMTSCHATKA, and the Altai Mts. of SIBERIA; south in eastern America to the higher mountains of MAINE and NEW HAMPSHIRE; in the interior to LAKE SUPERIOR and MANITOBA; and in the western mountains to SOUTH DAKOTA, COLORADO, UTAH, and northern CALIFORNIA. (Pl. VI, figs. 39, 40.)

B. GLANDULOSA, var. ROTUNDIFOLIA, Regel in DC., l. c. 172 (1864). *B. rotundifolia*, Spach, l. c. 194 (1841). *B. nana*, var. *sibirica*, Ledeb., Fl. Ross., iii, 654 (1849).—GREENLAND and northern LABRADOR to KAMTSCHATKA, and the Altai Mts. of SIBERIA, south to the higher mountains of MAINE and NEW HAMPSHIRE, and along the coast of ALASKA. Perhaps hybridizing with *B. pendula*. (Pl. VI, figs. 41–44.)

EXPLANATION OF PLATES.*

Plate V, figs. 1–6, Betula alba.

Figure 1.—Leaf of young flowering branch of *B. pubescens*, Ehrh., from the Vosges Mts., near Rambervilles, France (*Joad*).

Figure 2.—Leaf of fruiting branch of *B. papyrifera*, Marsh., from Lake Winnipeg, Manitoba (*Bourgeau*).

Figure 3.—Leaf of fruiting branch of *B. occidentalis*, Hook., from Pend d'Oreille River, British Columbia (*Lyall*).

Figure 4.—Leaf of young branch of *B. pubescens*, Ehrh., from Bohemia (Tausch).

Figure 5.—Leaf of fruiting branch of *B. papyrifera*, Marsh., from Southport, Maine (*Fernald*).

Figure 6.—Leaf of fruiting branch from Austria—after Ettingshausen and Pokorny, Phys. Pl. Aust. iii, t. 201.

Plate V, figs. 7 to 12, B. alba, var. minor.

Figure 7.—Leaf of fruiting branch of *B. tortuosa*, Ledeb., from the Altai Mts., Siberia (ex. herb. St. Petersb.).

Figure 8.—Leaf of fruiting branch of *B. odorata*, var. *tortuosa*, Lange, from the Dovre Mts., Norway—after Lange, Fl. Dan. xvii, t. 2918.

Figures 9, 10.—Leaves of original fruiting branches of *B. papyracea*, var. *minor*, Tuck., from Mt. Washington, New Hampshire.

Figure 11.—Leaf of dwarf form of *B. papyracea*, var. *minor*, Tuck., from Mt. Washington, New Hampshire (*Faxon*).

Figure 12.—Leaf of fruiting branch of *B. odorata*, var. *minor*, Rosenvinge in herb., from Greenland (*Hartz*).

Plate V, figs. 13, 14, B. alba var. carpatica.

Figure 13.—Leaf of fruiting branch of *B. borealis*, Spach, from Anticosti, Quebec (*Macoun*).

Figure 14.—Leaf of *B. alba*, subsp. *pubescens*, ζ *carpatica*, Regel, from Lapland (*Regel*).

Plate V, figs. 15 to 18, Plate VI, figs. 19 to 22, B. pendula.

Figures 15, 17.—Leaves of young flowering branch of *B. alba*, subsp. *verrucosa*, δ *resinifera*, Regel (type of *B. alaskana*, Sargent) from Saskatchewan (*Bourgeau*).

Figures 16, 18.—Leaves of fruiting branch of *B. verrucosa*, Ehrh., from Christiania, Norway (*Blytt*).

Figure 19.—Leaf of fruiting branch of *B. pendula*, from Warren, Illinois (*L. M. Umbach*, sheet No. 351,017 U. S. Nat. Herb.).

Figure 20.—Leaf of fruiting branch from Gotland, Sweden (*Blomberg*).

Figure 21.—Leaf of *B. alba*, subsp. *mandshurica*, Regel, from Mandschuria—after the original illustration (Regel, Bull. Soc. Imp. Nat. Mosc., 1865, t. 7, fig. 15).

Figure 22.—Leaf of fruiting branch of *B. verrucosa*, δ *resinifera*, Regel, from Nushagak River, Yukon District, Alaska (*McKay*).

Plate VI, figs. 23, 24, B. pendula, var. japonica.

Figure 23.—Leaf of *B. alba*, subsp. *latifolia*, *a Tauschii*, Regel, from Eastern Asia—after Regel, Bull. Soc. Imp. Nat. Mosc., 1865, t. 7, fig. 11.

Figure 24.—Leaf of *B. kenaica*, W. H. Evans, from Cook Inlet, Alaska (*Coville and Kearney*, No. 2412).

*The plates illustrating this paper have been carefully prepared by Mr. F. Schuyler Mathews. Unless otherwise stated, the figures are life-sized.

PLATE VI, figs. 25 to 32, B. MICROPHYLLA.

FIGURE 25.—Leaf of young shoot of *B. microphylla* from the Altai Mts., Siberia (ex. herb. St. Petersberg).

FIGURE 26.—Leaf of *B. fruticosa*, var. *cuneifolia*, Regel (syn. *B. microphylla*, Bunge) from the Altai Mts., Siberia—after Regel, Mon. Bet. (1861) t. 7, fig. 18.

FIGURE 27.—Leaf of fruiting branch of *B. occidentalis*, Nutt. (*B. fontinalis*, Sargent) from Idaho Springs, Colorado (*Engelmann*).

FIGURE 28.—Small leaf from fruiting branch of *B. occidentalis*, Nutt. (*B. fontinalis*, Sargent) from Coulee City, Washington (*Lake and Hull*, No. 790).

FIGURE 29.—Leaf of young shoot of *B. occidentalis*, Nutt. (*B. fontinalis*, Sargent) from the Black Hills, South Dakota (*Rydberg*, No. 1006).

FIGURE 30.—Leaf of fruiting branch of original material of *B. alba*, subsp. *soongorica*, *β microphylla*, Regel, from the Tyan Shan Mts., Central Asia (Semenow).

FIGURES 31, 32.—Leaves of fruiting branch of *B. occidentalis*, Nutt. (*B. fontinalis*, Sargent) from Laramie Peak, Wyoming (*A. Nelson*, No. 1647).

PLATE VI, figs. 33 to 38, B. PUMILA.

FIGURE 33.—Leaf of sterile shoot of *B. pumila* from Anticosti, Quebec (*Macoun*).

FIGURE 34.—Leaf of sterile shoot of *B. alpestris*, Fries, from Lapland (*Laestadius*).

FIGURE 35.—Tip of branch from Bonne Espérance, Quebec (*Allen*, No. 70).

FIGURE 36.—Leaves of glabrate form from Bay of Islands, Newfoundland (*Waghorne*).

FIGURE 37.—Leaves of *B. alpestris*, Fries, from Norway—after Lange, Fl. Dan., Suppl. t. 37.

FIGURE 38.—Leaves of young branch of *B. alpestris*, Fries, from Lapland (*Andersson*, No. 186).

PLATE VI, figs. 39, 40, B. GLANDULOSA.

FIGURE 39.—Leaf of branch from Mt. Washington, New Hampshire (*J. A. Allen*).

FIGURE 40.—Leaves of branch from Hopedale, Labrador (*Sornborger*, No. 80).

PLATE VI, figs. 41 to 44, B. GLANDULOSA, var. ROTUNDIFOLIA.

FIGURE 41.—Leaf from Mt. Washington, New Hampshire.

FIGURES 42, 43.—Leaves from Nunivak Island, Behring Sea (*J. M. Macoun*).

FIGURE 44.—Leaf from the Altai Mts., Siberia (ex. herb. St. Petersb.).

PLATE VI, figs. 45, 46, B. NANA.

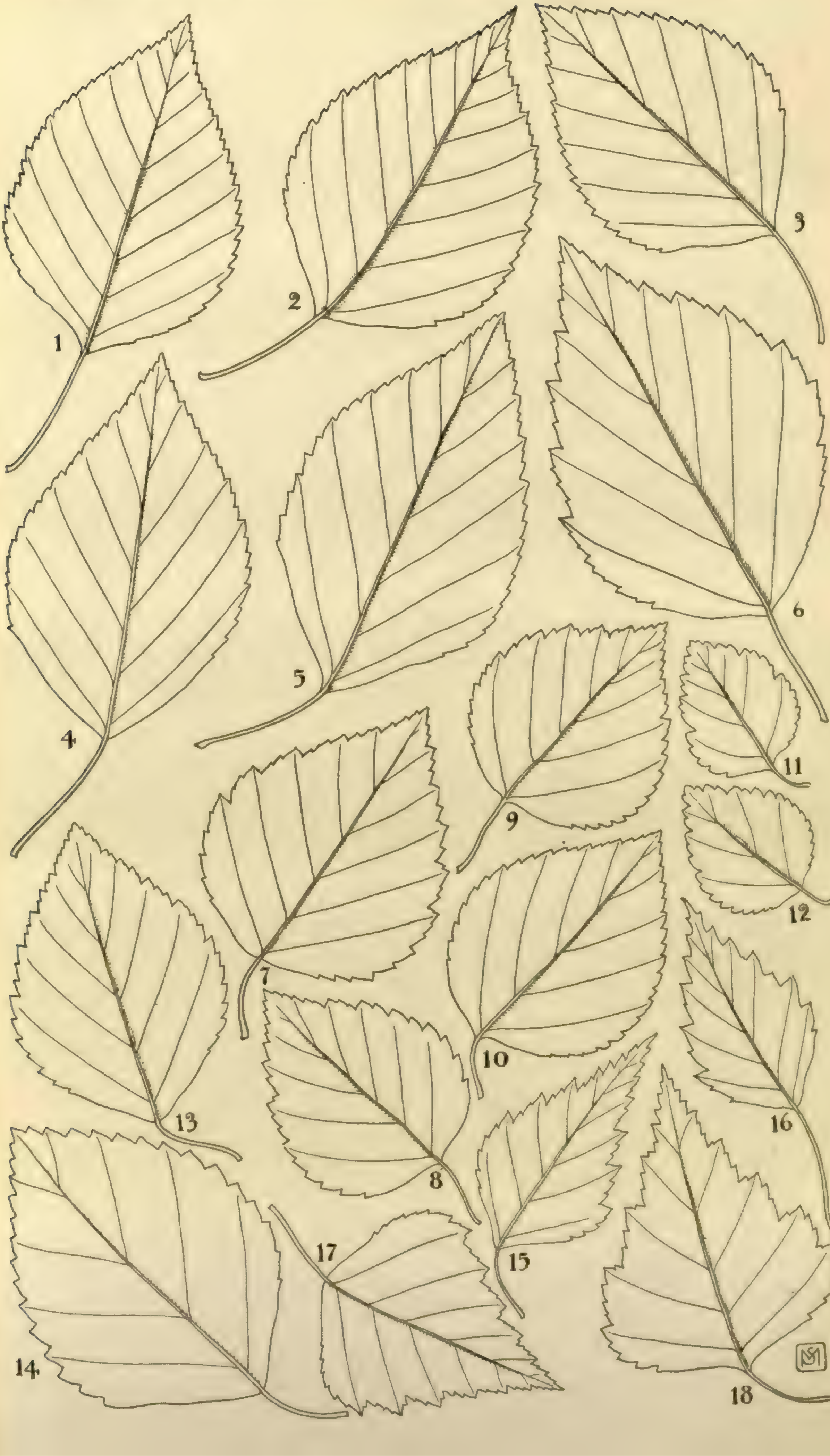
FIGURE 45.—Fruiting branch from Grenjadastad, Iceland (*Elizabeth Taylor*).

FIGURE 46.—Scale from same, enlarged three times.

PLATE VI, figs. 47, 48, B. NANA, var. MICHAUXII.

FIGURE 47.—Fruiting branch from Grand Lake, Newfoundland (*Waghorne*).

FIGURE 48.—Scale from same, enlarged three times.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CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

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FLORA OF THE GALAPAGOS ISLANDS.

The peculiar character of the vegetation on the Galapagos Islands was brought to scientific attention in 1847 by Sir Joseph Dalton Hooker. His flora of the archipelago, based chiefly upon the collections of Charles Darwin, showed clearly that these islands, although small in extent, volcanic in character, and only five hundred to six hundred miles from Ecuador, possess a vegetation striking in individuality and very unlike that of the adjacent mainland. Darwin, who visited the Galapagos on the memorable voyage of the "Beagle," landed on four of the islands (Chatham, Charles, James, and Albemarle). He was able to spend only a few days upon each, and naturally much of his attention was devoted to the general topography, the geology, and especially the peculiar fauna; moreover the season was one of drought; yet he was able to collect 201 different plants. These, supplemented by smaller collections (chiefly those of Douglas & Scouler, Macrae, and Edmonston), enabled Hooker to include in his enumeration 239 species, of which no less than 107 were described as new to science, thus indicating an extraordinary endemic element of nearly forty-five per cent of the whole flora of the islands, a proportion which became still more remarkable when the imperfectly represented thallophytes, and certain phanerogams, believed to be artificially introduced weeds, were omitted from consideration.

In 1852 Prof. N. J. Andersson, well known for his critical studies in *Salix*, visited the Galapagos Islands on a voyage of the Swedish frigate "Eugenie." He landed upon five of the islands, four of them being the same as those visited by Darwin, and the fifth (Indefatigable) until then entirely unknown botanically. The sailing schedule of his vessel permitted him to remain but a few hours upon some of the islands, and upon none more than two or three days. Nevertheless, he was able to secure an excellent collection of plants, including 338 numbers, many

of which were represented by several specimens. These plants, critically determined by Andersson himself and distributed to the leading herbaria of various countries, have long furnished the chief reference specimens for the interesting vegetation they represent. In 1853 Andersson published a detailed flora of the islands, and in 1857 he republished the same work in revised form and well illustrated.

Since the appearance of these classical papers by Hooker and Andersson, there has been no general revision of the Galapageian flora. The islands have been visited, however, and plants collected upon them, — in 1868–1869 by Dr. A. Habel, in 1871 by the Hassler Expedition under the direction of Professor Louis Agassiz, in 1875 by Dr. Theodor Wolf, in 1884 by Lieutenants Chierchia and Marcacci, in 1888 by Professor Leslie A. Lee, in 1891 by Mr. Alexander Agassiz, also by the late Dr. Georg Baur and his assistant, Mr. C. F. Adams, and finally by Messrs. Robert E. Snodgrass and Edmund Heller of the Hopkins-Stanford Expedition. Not only have these collectors secured much additional material from the five larger islands, visited by Darwin and Andersson, but many specimens are now at hand, chiefly through the efforts of Dr. Baur and Messrs. Snodgrass and Heller, to illustrate the florulae of no less than twelve of the smaller islands, of which nearly all include new and peculiar species or forms. Furthermore, since the appearance of Andersson's works there have been many scattered notes, in monographic treatments of families and genera, throwing new light upon the identity, affinities, and nomenclature of Galapageian plants. It has therefore seemed desirable during the study of the rich botanical collections secured by the Hopkins-Stanford Expedition and referred by the Zoölogical Department of Stanford University to the Gray Herbarium for examination, to undertake a general recension of the flora of the Galapagos Islands, and to bring together its now more extensive bibliography, synonymy, and records of distribution. This has appeared the more worth while because some of the species regarded as new in the earlier treatments of the flora have dropped into synonymy and others formerly supposed peculiar to the islands are now known to occur in other regions; so that without a comprehensive revision it would be well nigh impossible to draw any statistical summary or show (1) in how far the vegetation of the archipelago is really peculiar, (2) to what other floras it is most nearly related, and (3) the complicated affinities existing between the florulae of the different islands. Finally, to these incentives there has been added a wish to derive, if possible, new light upon the origin of the islands themselves.

I am greatly indebted to my colleague, Professor W. G. Farlow, for the treatment of the difficult orders of *Fungi*, *Lichenes*, *Algae*, and *Musci*, to Dr. A. W. Evans of Yale University for the treatment of the *Hepaticae*, and to Professor K. Schumann of the Royal Botanical Museum at Berlin for the elaboration of the *Cactaceae* of the Hopkins-Stanford Expedition. Further expert assistance has been kindly and very promptly given by Mr. Casimir de Candolle of Geneva (*Peperomia*), Mr. C. B. Clarke of Kew (*Kyllinga*), Professor A. Cogniaux of Verviers (*Miconia*), Professor F. Lamson-Scribner of the United States Department of Agriculture (*Chloris*), Dr. Gustav Lindau of Berlin (*Justicia*), and Dr. Hans Hallier of Hamburg (*Ipomoea*). I am likewise indebted to Sir W. T. Thiselton-Dyer and Mr. W. Botting Hemsley for some comparisons at the Royal Gardens at Kew and for a list of the plants collected upon the Galapagos Islands by Dr. A. Habel. Mr. F. V. Coville and Dr. J. N. Rose of the United States National Museum have generously furnished me with duplicates of many of the plants secured on the Galapagos and Cocos Islands by Messrs. A. Agassiz and Lee, and also sent several unicates for examination. Professor William Trelease has obligingly forwarded the Galapageian *Cactaceae* from the Engelmann Herbarium for comparison. Sir J. D. Hooker has kindly given me interesting data concerning the history of the botanical exploration on the islands, Mr. J. Henry Blake, artist on the "Hassler," has furnished information regarding that expedition, and Miss Mary A. Day, librarian of the Gray Herbarium, has rendered efficient assistance in bibliography and tabulation as well as in an exhaustive search for information relating to the early expeditions to the islands. The plates have been drawn by Mr. F. Schuyler Mathews.

The bryophytes and thallophytes, as yet known to occur on the Galapagos Islands, are so few that they cannot be supposed in any adequate sense representative of the great groups to which they belong. It has, therefore, seemed best to exclude them from the tabular statistics. It may be remarked, however, that their inclusion would not have significantly altered the numerical relations presented.

Of the following plants, said to have been collected on the Galapagos Islands by Dr. Habel, the identifications (which cannot now be controlled by a reëxamination of the specimens) have seemed too doubtful to include in the catalogue: *Boerhaavia diffusa*, L., *Neptunia triquetra*, Benth., *Rhynchosia Senna*, Gillies, *Stylosanthes humilis*, HBK., *Tribulus terrestris*, L. var., *Acalypha parvula*, vars., *Waltheria ovata*, Cav., and *Evolvulus alsinoides*, L. var.

From Table I, reviewing the exploring expeditions which have done

botanical collecting upon the Galapagos Islands, it will be seen that plants have been secured under no less than 2300 numbers and that about two-thirds of these have been examined during the preparation of this paper. With the exception of two cacti in the Engelmann Herbarium I have been unable to locate the phanerogams said to have been collected by Dr. Thomas Hill on the Hassler Expedition, and I should be greatly obliged for any information regarding their disposition.

Although great pains have been taken to summarize in this paper every bit of available information regarding the flora of these islands, which have now been visited by more than a score of collectors, it must be admitted that our knowledge of the subject is still very incomplete. With all due appreciation of the valuable and self-sacrificing services which zoölogists and geologists have rendered in collecting plants in the Galapagos, it should be remembered, when interpreting the general results, that during the last half century the islands have been visited by only one trained botanical systematist and by him very hurriedly. It cannot be doubted that much remains to be done in exploring and recording the Galapageian flora, and it is to be earnestly hoped that future collectors will endeavor to secure *specimens* of *each* plant from *every* island, since these insular races are in many cases so similar that mere lists, based upon hurried field determinations, are almost valueless.

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Portulaceae from the Galapagos Islands. Lond. Jour. Bot. v. 1846, pp. 108–109.

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FUNGI.

By W. G. FARLOW.

Favolus, Fries.

F. ciliaris, Mont. Ann. Sci. Nat. Bot. ser. 2, xx. 364, t. 15, f. 2 (1843). — Narborough Isl.: southern part, alt. 615 m., Apr. 1899, *Snodgrass & Heller* (a single specimen). Further distrib. Madagascar and Japan.

Fomes, Fries.

F. lucidus, Fries, Nov. Symb. 61 (1855). *Boletus lucidus*, Leysser, Fl. Hal. 300 (1783). — Albemarle Isl.: Tagus Cove, *Snodgrass & Heller*. Further distrib. general.

Schizophyllum, Fries.

S. alneum, Schroeter, Pilz. Schlesien, i. 553 (1889). *S. commune*, Hook. f. (3), 164; Anderss. (1), 123, & (2), 35. *Agaricus alneus*, L. Sp. 1176 (1753). — Charles Isl.: *Darwin* acc. to Hook. f., l. c. Further distrib. general.

Besides the *Favolus* and *Fomes* above mentioned, the collection of Messrs. Snodgrass & Heller contains a small dried *Polyporus* and a dried agaric, also alcoholic material of two *Agaricini* and a small tremelline fungus; none of these being in condition to determine.

LICHENES.

By W. G. FARLOW.

Judged by the collections of previous expeditions as well as those of Messrs. Snodgrass & Heller, the lichen flora of the Galapagos Islands must be striking in appearance and abundant. Naturally the collections include principally the larger and more showy species of foliose and fruticulose habit, which are in most cases identical with species found along the Pacific Coast of America from California to Chili. Hooker (3), 164, records three lichens collected by Darwin on James Island; Andersson secured nine species from James and Chatham Islands, and Baur six from Charles, Albemarle, Hood, and Chatham Islands. The lichens collected by Hill on the Hassler Expedition were determined by Tuckerman and included three new species, *Lecanora glaucovirens*, *Rinodina mamillana*, and *Pertusaria albinea*, the second species having been found previously in Hawaii. Willey in his Synopsis of the Genus Arthonia, 1890, described an *Arthonia nivea* from the Galapagos Islands (collected by Hill), and reported *A. platyspeilea* Nyl., as well as a third unnamed species. The last was sent to Nylander, but I am unable to ascertain whether it was ever named by him. Apparently a considerable number of lichens were collected by the Hassler Expedition, but no list of them was ever made so far as I am aware, and as the specimens are scattered through the Tuckerman Herbarium no enumeration could be made without a long search. In the following catalogue reference is made to such of these specimens as have come under my notice.

Arthonia, Ach.

A gregaria, Koerb. Syst. 291 (1855); Willey, Synop. of gen. Arthonia, 7. *Sphaeria gregaria*, Weig. Obs. Bot. 43, t. 2, f. 10 (1772). — Duncan Isl.: on twigs, May, 1899, *Snodgrass & Heller*. Cosmopolitan.

A. nivea, Willey, Synop. of gen. Arthonia, 5 (1890). — Galapagos Ids.: Hassler Exped. [*Hill*]. Endemic.

A. platyspeilea, Nyl. Pr. N. Gr. 99 (1863); Willey, Synop. of gen. Arthonia, 16. — Galapagos Ids.: Hassler Exped. [*Hill*] acc. to Willey, l. c. Gardner Isl.: May, 1899, on twigs with *Pyrenula cerina*, *Snodgrass & Heller*. Also found in Florida.

A. sp. Willey, Synop. of gen. Arthonia, 41 (1890). — Galapagos Ids.: Hassler Exped. [*Hill*] acc. to Willey, l. c.

Buellia, De Not.

B. straminea, Tuck. in herb. — Albemarle Isl.: north of Pt. Christopher, 21 Jan. 1899, *Snodgrass & Heller*.

This small specimen of a crustaceous *Buellia* on a volcanic rock is identical with a large specimen in herb. Tuckerman, Galapagos Ids., Hassler Exped. [*Hill*] which is labelled *B. straminea*, Tuck., which, however, appears never to have been described. Why it was never published may perhaps be due to the fact that there is another specimen in herb. Tuckerman from the Galapagos Ids., Hassler Exped. [*Hill*], marked *B. flavo-areolata*, Nyl. and that Tuckerman was in doubt whether *B. straminea* was distinct from that species. There is, however, no note of Tuckerman stating his opinion. The Snodgrass & Heller lichen agrees perfectly with the specimen of *B. straminea*. In both the asci are obovate, 32–42 μ by 14–17 μ; spores fuscous, 2-celled, 11 μ by 8–9 μ; paraphyses hyaline, 2 μ in diam., branching only at the apex where they end in globose tips, 5 μ in diam., the upper half of which is dark colored. Iodine turns the hymenium blue. The specimen of *B. flavo-areolata* in herb. Tuckerman differs only in having spores rather larger and narrower, those of *B. straminea* being nearly globose, in which respect it corresponds better with the description of *Lecidea flavo-areolata*, Nyl., Ann. Sci. Nat. Bot. ser. 4, iii. 166 (1855). It seems to me probable that the two species are really the same, but in the absence of material to show the variations of the spores, it can only be said that our lichen is certainly *B. straminea* which differs from *B. flavo-areolata* in the shorter and comparatively broader spores.

B. sp. — Bindloe Isl.: on rocks, 20 June, 1889, *Snodgrass & Heller*.

A single specimen agreeing with some of the specimens referred to *B. lactea* in herb. Tuckerman, but it is not certain how far these agree with the views of other lichenologists.

Chiodecton, Ach.

C. sanguineum, Wainio, Lichens du Brésil, ii. 143 (1890). *Byssus sanguinea*, Sw. Prodr. Fl. Ind. 148 (1783). *Hypochnus rubrocinctus*, Ehrh. Hor. Phys. Berol. 84 (1820). — Abingdon Isl.: alt. 250 m., 25 June, 1899, *Snodgrass & Heller*. Widely distributed in the warmer parts of the world.

Cladonia (Hill) Wainio emend.

C. pycnoclada, Nyl. Jour. Linn. Soc. ix. 244 (1866). *Cenomyce pycnoclada*, Gaudichaud, Ann. Sci. Nat. Bot. v. 95 (1825). *Cladonia rungiferina*, var. auct. var. — Albemarle Isl.: mountain east of Iguana Cove, alt. 925 m., Feb. 1899, *Snodgrass & Heller*; mountain east of Tagus Cove, alt. 770 m., Feb. 1899, *Snodgrass & Heller*. Further distrib. S. Am., Africa, Asia, Australia.

Lecanora, Ach.

L. glaucovirens, Tuck. Proc. Am. Acad. xii. 172 (1874). — Galapagos Ids.: Hassler Exp. [*Hill*]. Endemic.

Parmelia, Ach.

P. perlata, Kremph. Flora, lii. 222 (1869); Anderss. (1), 124, & (2), 36. — Abingdon Isl.: *Snodgrass & Heller*. Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*. Charles Isl.: *Andersson* (specimen not seen by the writer). The specimens of Messrs. Snodgrass & Heller are small and sterile but appear to belong to this common species.

P. sp. (*P. physodi*, Fries affinis) Andersson (1), 124, & (2), 36. — Charles Isl.: *Andersson*. Sterile and indeterminate, not seen by the writer.

Pertusaria, DC.

P. albinea, Tuck. Proc. Am. Acad. xii. 177 (1877). — Galapagos Ids.: on bark, Hassler Exp. [*Hill*]. Endemic.

Physcia (DC.) Th. Fr.

P. leucomela (L.) Michx. Fl. Bor.-Am. ii. 306 (1803). *Lichen leucomelas*, L. Sp. ed. 3, 89 (1764). *Parmelia leucomela*, auct. var.

P. leucomela, var. *filiformis*, Anderss. (1), 124, & (2), 36. *Borrera leucomelas*, var. *filiformis*, Hook. f. (3), 164. — James Isl.: *Darwin*, acc. to Hook. f., l. c. who states that "the same slender variety is common on the Peruvian Coast."

Pseudocyphellaria, Wainio.

P. aurata, Wainio, Lichens du Brésil, i. 183 (1890). *Sticta aurata*, Ach. Meth. Lich. 277 (1803); Hook. f. (3), 164; Anderss. (1), 124, & (2), 36. — Albemarle Isl.: mountain east of Iguana Cove, alt. 925 m., Feb. 1899, *Snodgrass & Heller*. James Isl.: *Darwin*. Narborough Isl.: southern part, alt. 615 m., March, 1899, *Snodgrass & Heller*. Further distrib. general.

Pyrenula, Fée.

P. cerina, J. Muell, Flora, lxvii. 667 (1884). *Verrucaria cerina*, Eschw. Bras. 133 (1833). *Pyrenula aurantiaca*, Fée, Suppl. 82, t. 37, f. 1 (1837). — Narborough Isl.: southern part. alt. 615 m., 5 April, 1899, *Snodgrass & Heller*. 'On branches of the palo santo (*Bursera graveolens*) with spermagonia and spores. The latter are obtusely elliptical, 28 μ by 14 μ, at first hyaline and multiguttulate but becoming dark and 4-celled. Further distrib. Bermuda, S. Am.

Ramalina, Ach.

R. complanata, Ach. Lich. Univ. 599 (1810). *Lichen complanatus*, Sw. Fl. Ind. Occ. iii. 1911 (1806). — Galapagos Ids.: Hassler Exp. [*Hill*]. Charles Isl.: Cuevas Bay, *Baur*. Gardner Isl.: May, 1899, *Snodgrass & Heller*. Hood Isl.: May, 1899, *Snodgrass & Heller*. Tower Isl.: June, 1899, *Snodgrass & Heller*. Further distrib. warmer parts of America, East Indies, Australia.

R. indica, Fr. Kongl. Vet. Ak. Handl. 43 (1820); Anderss. (1), 123, & (2), 35. — Charles Isl.: on trunks of trees in the upper region, *Andersson*. Not seen by the writer. Further distrib. India.

R. usneoides, Fr. Lich. Eur. 468 (1831). *Parmelia usneoides*, Ach. Meth. Lich. 270 (1803). — Bindloe Isl.: 20 June, 1899, *Snodgrass & Heller*, a small form. A characteristic species of the warmer regions of America. A specimen in herb. Tuckerman collected on the Galapagos Ids. by the Hassler Exp. [*Hill*], and marked *Alectoria sarmentosa* appears to belong rather to this species.

Rinodina, Mass.

R. mamillana, Tuck. Proc. Am. Acad. vii. 226 (1866), & xii. 174. — Galapagos Ids.: Hassler Exp. [*Hill*]. Further distrib. Oahu, Hawaiian Ids.

Roccella, DC.

The most striking feature of the maritime lichen flora of the Galapagos Islands as well as of the west coast of America from California southward is the abundance of species of *Roccella* of which very fine specimens were collected by Messrs. Snodgrass & Heller. In most herbaria the *Roccellae* of this region are somewhat vaguely placed under the species *R. fuciformis* and *R. tinctoria*, the complanate forms being referred to the former and the more or less terete forms to the latter. The excellent Monographia Roccelleorum of Darbishire, Stuttgart, 1898, affords the means of a more satisfactory determination. The separation of *Dendrographa* and *Roccellaria* from *Roccella* on the structure of the cortex is well founded. All the specimens of this group collected by Messrs. Snodgrass & Heller belong to the genus *Roccella* proper.

R. peruensis, Darb. Bull. Herb. Boiss. v. 763 (1897), & Monogr. Rocc. 47, t. 18, 19, f. 83–88 (1898). *R. Montagnei*, var. *peruensis*. Kremph. Verh. Zoöl. Bot. Gesell. Wien, xxvi. 443 (1876). *R. fuciformis*, C. E. Cummings in Rob. & Greenm. (1), 149, not Ach. — Albemarle Isl.: *Baur*. Barrington Isl.: *Snodgrass & Heller*. Charles Isl.: *Baur*. Chatham Isl.: *Snodgrass & Heller*. Duncan Isl.: *Snodgrass & Heller*. Gardner Isl.: *Snodgrass & Heller*. Hood Isl.: *Baur; Snodgrass & Heller*. Tower Isl.: *Snodgrass & Heller*. A considerable number of specimens were collected, none, however, with apothecia. The yellow basal filaments described by Darbishire are present in this species, which grows on shrubs. The specimens are larger and broader than the figures of this species in Darbishire and some resemble more closely his figure of *R. portentosa*, t. 8, f. 32. It may be questioned whether that figure really belongs to *R. portentosa*. In all specimens having this habit there were present the yellow base and lignicolous habitat which indicate *R. peruensis*.

R. portentosa, Darb. Ber. Deutsch. Bot. Gesell. xv. 4 (1897), & Monogr. Rocc. 29, t. 7–11, f. 27–41 (1898). *R. tinctoria*, var. *portentosa*. Mont. in Gay, Pl. Chili, viii. 841 (1852). — Barrington Isl.: May, 1899, *Snodgrass & Heller*. Gardner Isl.: May, 1899, *Snodgrass &*

Heller. James Isl.: *Hill* of the Hassler Exp. (in hb. Tuckerman as *R. tinctoria*). Seymour Isl.: south, May, 1899, *Snodgrass* & *Heller*. Further distrib. Peru (a specimen in hb. Farlow coll. by Gaudichaud and distrib. as *R. tinctoria*, f. *dichotoma*).

R. intricata, C. E. Cummings in Rob. & Greenm. (1), 149, coll. by Baur upon Charles Island, has the cortex of *Roccella* proper and therefore cannot be placed in *Roccellaria* where *R. intricata* properly belongs but is a narrow form of *R. peruensis*. The same may be said of some, but perhaps not all, of the *R. phycopsis*, Hassler Exp. [*Hill*] from the Galapagos Islands in herb. Tuckerman.

Sticta, Schreb.

S. Weigelii, Wainio, Lichens du Brésil, i. 189 (1890). *S. damaecornis*, var. *Weigelii*, Ach. Lich. Meth. 446 (1810). — Albemarle Isl.: Iguana Cove, 30 Dec. 1898, *Snodgrass* & *Heller*. This is the *S. quercizans*, common throughout the warmer parts of America.

Teloschistes, Norm.

T. flavicans, Norm. Gen. Lich., 17, 1852. *T. chrysopthalmus*, var. *flavicans*, Auct.; C. E. Cummings in Rob. & Greenm. (1), 149. *Lichen flavicans*, Sw. Prodr. 147 (1788). *Evernia flavicans*, var. *crocea*, Anderss. (1), 123, & (2), 35. — Albemarle Isl.: *Snodgrass* & *Heller*. Charles Isl.: *Andersson; Snodgrass* & *Heller*. Chatham Isl.: *Baur*, acc. to C. E. Cummings, l. c. Duncan Isl.: *Snodgrass* & *Heller*. Further distrib. general.

Usnea, Dill.

U. arthroclada, Fée, Ess. Crypt. Écorc. xcvii. & ci. 3, f. 4, 5 (1824). — Narborough Isl.: southern part, alt. 615 m., 5 April, 1899, on *palo santo* trees (*Bursera graveolens*) with *Ramalina usneoides*, *Snodgrass* & *Heller*. Further distrib. Brazil.

This has a habit resembling *U. longissima* but stouter. With potash the medulla turns reddish brown, and this fact with the hard and polished cortex often breaking and forming articulations indicates *U. arthroclada*.

U. ceratina, Ach. Lich. Univ. 619 (1810). *U. barbata*, Ach. f. *ceratina* Schaer, Spec. 505 (1840). — Narborough Isl.: *Snodgrass* & *Heller*. Cosmopolitan.

U. plicata, Ach. Syn. Meth. 305 (1814); Hook. f. (3), 164; Anderss.

(1), 124, & (2), 36 — CHARLES ISL.: *Andersson*. JAMES ISL.: *Darwin*. Further distrib. general.

ALGAE.

By W. G. FARLOW.

CYANOPHYCEAE.

SCYTONEMA, Agardh.

S. MYOCHROUS, Ag. Disp. Alg. Suec. 38 (1812). *Conferva*, Dillw. Brit. Conferv. t. 19 (1802). — ALBEMARLE ISL.: Mangrove Swamp, Turtle Pt., *Snodgrass* & *Heller*. Further distrib. general.

CHLOROPHYCEAE.

BRYOPSIS, Lamx.

B. RAMULOSA, Mont. Cuba, 16, t. 3, f. 2 (1838). *B. pennatula*, J. G. Agardh, Oefver. Kongl. Vet. Akad. Förh. iv. 6 (1847). — WENMAN ISL.: Dec. 1898, *Snodgrass* & *Heller*. Further Distrib. W. Ind., Fla.

CAULERPA, Lamx.

C. RACEMOSA, Weber van Bosse, Ann. Jard. Bot. Buitenzorg, XV. 357 (1898). *Fucus racemosus*, Forsk. Flor. Aegypt. 191 (1775). *Caulerpa clavifera*, Ag. Spec. Alg. 437 (1823). — ALBEMARLE ISL.: Jan. 11, 1899, *Snodgrass* & *Heller*. Further distrib. tropical seas.

ENTEROMORPHA, Link.

E. CLATHRATA, Kütz. Phyc. Germ., 247 (1845). *Conferva clathrata*, Roth. Cat., III, 175 (1806). — ALBEMARLE ISL.: Turtle Pt. in mangrove swamp, *Snodgrass* & *Heller*. Further distrib. cosmopolitan.

OEDOGONIUM, Link.

O. sp. — ALBEMARLE ISL.: Iguana Cove with *Najas*, *Snodgrass* & *Heller*. An entangled mass of a sterile *Oedogonium*.

RHIZOCLONIUM, Kütz.

R. HOOKERI, Kütz. Tab. Phyc., III, Pl. 67, f. 2 (1853). — ALBEMARLE ISL.: Tagus Cove, Jan. 11, 1899, *Snodgrass* & *Heller*. Further distrib. Nicobar Ids., Chiloe, etc.

Entangled masses with cells 120–140 μ in breadth and of the same length or a little longer. Cell-walls rather thick. The rhizoidal branches

seen were very scanty, but that is often the case in other species of the genus. This seems to be the same as the *R. Hookeri* of Grunow, Novara, 37, and his remarks on the Nicobar specimens apply equally to ours. Hohenacker, 477, Chiloe, has cells rather longer and thinner. In spite of the occasional rhizoid processes, it seems to me possible that this may be an old, prostrate form of *Chaetomorpha antennina* (Bory) corresponding to the similar form known in *C. aerea*.

Ulva (L.) Wittr.

U. fasciata, Delil. Egypt, 153, Pl. 158, f. 5 (1813). — Albemarle Isl.: Tagus Cove, Feb. 1899, *Snodgrass & Heller*. Further distrib. warmer parts of Atlantic and Pacific Oceans, Ceylon.

*PHAEOPHYCEAE.**

Carpomitra, Kütz.

C. Cabrerae, Kütz. Phyc. Gen. 343 (1843). *Fucus cabrera*, Clemente, Cat. 313; Turner, Hist. Fuc. Pl. 140 (1811); Piccone (1), 40. — Chatham Isl.: *Marcacci*, acc. to Piccone, l. c. Further distrib. southern Eu., Africa.

Fucodium, J. Ag.

F. galapagense, Picc. & Grun. in Piccone (1), 40, t. 1, f. 1, t. 2, f. 3, & (2), 22. — Charles and Chatham Ids.: *Marcacci*, acc. to Piccone, ll. cc. Endemic.

Glossophora, J. Ag.

G. galapagensis, nov. sp.

Frons usque 18 cm. longit., .6 cm. latit. linearis-elongata, saepe dichotoma, axillis apicibusque obtusis, margine distincte spinosa; undique

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* *DIATOMEAE.* Many species of this order from the Galapagos Islands are enumerated by Ehrenberg (2), and the following are recorded by Cleve in his paper On some new and little known Diatoms, Kongl. Svenska Vetensk. Akad. Handl. xviii. no. 5, pp. 26, Pl. I–VI, 1881. *Mastogloia panduriformis*, Cl.; *M. submarginata*, Cl. & Grun.; *Navicula Eugeniae*, Cl.; *N. Hennedyi*, var. *undulata*, Cl.; *N. Hennedyi*, var. *minuta*, Cl.; *N. Platessa*, Cl.; *N. Anderssonii*, Cl.; *N. gallapagensis*, Cl.; *N. jugata*, Cl.; *Surirella degenerans*, Cl.; *S. formosa*, Cl.; *Campylodiscus peramplus*, Cl.; *Plagiogramma spinosum*, Cl.; *Rutilaria recens*, Cl.; *Melosira tuberculosa*, Cl.; *Auliscus insignis*, Cl.; *Biddulphia gallapagensis*, Cl.; *Triceratium Tripos*, Cl.; *T. Anderssonii*, Cl.; *T. laeve*, Cl.; *T. gallapagense*, Cl.; *T. Margaritiferum*, Cl.

praecipue in parte inferiore phylliculis vestita quae basem versus deorsum ad instar radicorum prolongantur. Sori oosporiferi minuti irregulariter supra frondem sparsi. — ALBEMARLE ISL.: Turtle Pt., March, 1899, *Snodgrass & Heller*.

In all the specimens there are leaflets on both surfaces of the fronds except near the tips. They arise from the cortical cells, and have no connection with the fructification which is found on the frond itself. Near the base the leaflets grow downward, become somewhat thicker and twisted and bear on their lower surface the proper rhizoids so that the fronds are attached by what is generally called a fibrous base. In spite of the leaflets which would lead one to refer this alga to the genus *Glossophora*, it seems to me to be less closely related to *G. Kunthii*, J. Ag. of Peru, the type of the genus, than to *Dictyota crenulata*, J. Ag. of the Pacific Coast of Mexico. As originally described from Mexico that species has no leaflets and the base is described as stuposc. In 1884 Grunow described a variety from the Canary Islands with leaflets, but its relation to that species is uncertain. The Galapagos species differs so much from *D. crenulata* as originally described, and from the var. *canariensis* that it must be kept distinct. If material hereafter collected should show that the two species are really forms of a single species, a new description will be needed. The following notes on the microscopic structure of the Galapagos alga will be of interest.

In the upper part the froud is about 100 μ thick, becoming 200 μ thick below. Above, there is a single medullary layer of large cells 70 μ × 70 μ × 168 μ and a single layer of colored cortical cells 14 μ × 14 μ in section. Below, the cortical cells become rather deeper, 22 μ × 14 μ in section, and the medullary cells thicker-walled and comparatively narrower, 112 μ × 56 μ in section, and between the medullary and cortical cells is a single layer of flattened colorless cells, 28 μ × 28 μ × 90 μ. The tangential walls of the medullary cells are pitted to an extent seldom seen in algae of this order. The oogonia are 80 μ or more in diameter and found in small numbers in scattered sori on the frond. The spines are sharper and more solid than in most of the ciliate species, 24–32 mm. long, the tips deeper colored than the base.

PADINA, Adams.

P. DURVILLAEI, Bory, Coquille, 147, t. 21, f. 1 (1829). — ALBEMARLE ISL.: Tagus Cove, and Turtle Pt., Feb. & Mar. 1899, *Snodgrass & Heller*. CHATHAM ISL.: north, Aug. 1891, *Baur* as *Zonaria lobata*. Further distrib. W. Ind., west coast of Am.

Typical specimens of this fine species were collected, some more than 12 cm. long. The species has a characteristic rusty-brown color and is coarser than *P. Paronia*. In the median portion the frond has usually ten layers of cells, 80 × 40 μ in section, and a single layer of cortical cells, 14 × 9 μ. The very large oosporangia vary from 110–125 μ × 70–84 μ.

Sargassum, Ag.

S. cymosum, Ag. Spec. i. 20 (1821); J. Ag. Sp. Sarg. Austr. 109 (1889). — Albemarle Isl.: Tagus Cove and Turtle Pt., March, 1899, *Snodgrass & Heller*. Wenman Isl.: Dec. 1898, *Snodgrass & Heller*. Further distrib. warmer Atlantic coasts of Asia and Africa.

In the determination of this specics I have followed J. Ag. l. c. (1889) and the Albemarle and Wenman Island specimens seem to me to belong to *S. cymosum* as that species is limited by J. Agardh. The species has, however, been variously interpreted by different writers.

S. galapagense, Grunow in Piccone (1), 48, t. 1. — Chatham Isl.: *Marcacci*, acc. to Piccone, l. c. Endemic.

S. galapagense, var. setifolia, Grunow in Piccone (1), 48, t. 2, f. 1, 2 (1886). — Albemarle Isl.: Tagus Cove and Turtle Pt., Feb. 1899, *Snodgrass & Heller*. Chatham Isl.: March, 1884, *Marcacci*, acc. to Piccone, l. c. Endemic.

As is remarked by J. Agardh, l. c., 122, this variety is closely related to *S. piluliferum* (Turn.) Ag., of California and Japan, but not to *S. acinaria* (Turn.) J. Ag., as suggested by Grunow.

? S. graminifolium, J. Ag. Spec. i. 103 (1848). *Fucus graminifolius*, Turn. Hist. Fuc. Pl. 210 (1819). — Wenman Isl.: *Snodgrass & Heller*. Further distrib. China Sea.

To this species is referred with much doubt a single specimen of a *Sargassum* with the upper fructiferous portion only. The receptacles are racemose, the conceptacles contain antheridia and oogonia, and the leaves are long, narrow, serrate, with but few cryptostomata.

S. lendigerum, var. foliosa, Grunow in Piccone (1), 49. — Chatham Isl.: March, 1884, *Marcacci*, acc. to Piccone, l. c.

S. lendigerum, var. furcifolia, Grunow, l. c. 50. — Chatham Isl.: March, 1884, *Marcacci*, acc. to Piccone, l. c.

Of the var. *foliosa*, Grunow described two forms, *subdelicatula* and *rigidiuscula* and of var. *furcifolia* a forma *denticulata*. J. Agardh, l. c.

122, remarks that the var. *furcifolia* is hardly different from *S. galapagense*. *S. lendigerum* is a species known mainly from the figure in Turner, Hist. Fuc. Pl. 48 (1808), with which agree the specimens from Bermuda referred to *S. lendigerum* by J. Agardh, l. c. 110, and the species appears to be limited to the Atlantic. None of the specimens of Snodgrass & Heller can be referred to *S. lendigerum*, but it is probable that some of the forms of Grunow's var. *foliosa* may be the same as specimens which I have included under *S. cymosum*.

Spatoglossum (Kuetz.), J. Ag. Emend.

S. Schroederi, Kuetz. Tab. Phyc. ix. 21, t. 51, f. 1 (1859); Piccone (2), 17. *Zonaria*, Ag. Syst. 265 (1824). — Charles Isl.: *Marcacci*, acc. to Piccone, l. c. Further distrib. Brazil, W. Ind.

Zonaria, J. G. Agardh.

Z. lobata, Ag. Syst. 265 (1824); Piccone (1), 89, & (2), 40. — Charles and Chatham Ids.: March, 1884, *Marcacci*. Further distrib. trop. Atlantic coast of America, Teneriffe, Cape of Good Hope.

RHODOPHYCEAE.

Amphiroa, Lamx.

A. dilatata, Lamx. Hist. Polyp. Flex. 299 (1816); Piccone (1), 66, & (2), 46. — Albemarle Isl.: Elizabeth Bay, *Snodgrass & Heller*. Charles Isl.: *Snodgrass & Heller*. Further distrib. Australia.

A. Orbigniana, Decaisne, Ann. Sci. Nat. Bot. ser. 2, xviii. 124 (1842). — Albemarle Isl.: Turtle Pt., March, 1899, *Snodgrass & Heller*. Further distrib. Pacific Coast of Am.

The specimens are covered with parasites and not in typical condition, but they appear to belong to this species.

A. peruana, Aresch. Phyc. Extraeur. 41 (1854). — Wenman Isl.: Dec. 1898, *Snodgrass & Heller*. Further distrib. Florida, Peru.

Callophyllis, Kütz.

C. sp. — Albemarle Isl: Iguana Cove, *Snodgrass & Heller*.

Two small specimens with cystocarps which are of large size, some of them with marked papillae around the carpostome. The species is apparently near *C. furcata*, Farl. but the specimens are incomplete and cannot be referred with certainty to that species.

Chondrus, Stack.

C. canaliculatus, Grev., Alg. Brit., lv. (1830). *Sphaerococcus canaliculatus* C. Ag. Spec. I, 260 (1822). — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*. Further distr. West coast of S. Am.

A single specimen which can be referred to this species. There are a few specimens which may perhaps belong to this species but they certainly are not normal. They have the structure of the frond and the sporidia of *Chondrus*, but, in the absence of cystocarps, there is a possibility that they may belong to the genus *Iridaea*. Their habit, however, is that of *Chondrus*, but the fronds are occasionally perforate, which may however be accidental rather than normal.

Corallina, Lamx.

? C. Berterii, Mont. in Harvey,.Ner. Austr. ii. 103 (1858), & Fl. Chili. viii. 318. — Albemarle Isl.: Elizabeth Bay, *Snodgrass & Heller*. Further distrib. Chili.

Much covered with parasites and not in favorable condition to be determined.

Dasya, C. Ag.

D. **Stanfordiana**, nov. sp.

Frons cylindrica, ad 15 cm. longit., basem versus 1.25 mm. latit., irregulariter composito-pinnata, usque apicem dense corticata, ramis superne elongatis, ramellis subaequalibus, brevibus, circa 32 mm. longit., vestitis. Ramelli monosiphonii, spiraliter inserti, unilateraliter cymosi, cellulis 56 μ × 28 μ, cellula terminali conica, inter ramificationes bicellulis. Stichidia primum ovato-lanceolata demum cylindrico-apiculata, 168 μ × 28 μ bene evoluta, sporidiis 20-seriebus et ultra ordinatis, cellulis pericentralibus 5–8. Color roseo-purpureus, substantia gelatinosa. Chartae arcte adhaeret. — Wenman Isl.: Dec. 21, 1898, *Snodgrass & Heller*. Albemarle Isl.: Turtle Pt., March, 1899, *Snodgrass & Heller*.

A species resembling *D. pacifica*, Harv. in its long stichidia but differing in its long slender habit quite unlike that of *D. arbuscula* J. Ag. to which *D. pacifica* bears a strong resemblance and in its branches densely corticated to the apex. In the authentic specimen of *D. pacifica* which I have examined the pericentral cells were easily seen at some distance from the apex, whereas in *D. Stanfordiana* they can be seen only at the extreme tip on account of the thick cortex. The monosiphonous ramelli and the exposed sporangia agree with those of *Dasya*

as defined by Falkenberg, but there is a free cell between those from which the divisions of the ramelli arise. With this exception, the plan of ramification follows the type shown in Falkenberg, fig. 10, A. The divisions of the ramelli are not divergent but penicillate with a tendency to be slightly convergent. The older stichidia are very long and the consecutive series of sporidia are often as many as 20 and sometimes more, showing 3–4 sporangia on side view. The branches are radial and not dorsiventral, although in drying they have the appearance of being flattened in the upper part. In section of the larger branches it was not possible to recognize any definite axial or pericentral cells in the material examined, but they had probably collapsed in the preparation.

Dilsea, Stack.

D. sp. — Albemarle Isl.: Iguana Cove, Dec. 30, 1898, *Snodgrass & Heller.*

A single imperfect specimen with sporangia; the material insufficient for specific determination.

Galaxaura, Lamx.

G. marginata, Lamx. Hist. Polyp. Flex. 264 (1816). *Corallina marginata*, Ell. & Sol. 122, t. 22, f. 6 (1786). *Brachycladia*, Sonder et Auct. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller.* Further distrib. tropical seas.

Gelidium, Lamx.

G. crinale, J. Ag. Epicr. 546 (1876). *Fucus crinalis*, Turn. Hist. Fuc. Pl. 198 (1819). *Gelidium corneum*, var. *crinale*, Auct.; Piccone (2) 39. — Charles Isl.: *Marcacci*, acc. to Piccone, l. c. Further distrib. general.

G. serrulatum, J. Ag. Oefv. Kongl. Vet. Akad. Förh. iv. 11 (1847). — Wenman Isl.: Dec. 1898, *Snodgrass & Heller.* Further distrib. Venezuela.

Several specimens of a *Gelidium* were collected at Wenman Isl. with well-developed bilateral conceptacles characteristic of the genus. One would have expected from this locality rather *G. filicinum*, Bory, Coquille, 162 (1829), than *G. serrulatum* since the former species was first described from Chili, whereas the latter is an Atlantic species. I have been able to compare the Wenman Isl. specimens with an authentic specimen of *G. filicinum* from herb. Bory through the kindness of

Dr. E. Bornet and with an authentic specimen of *G. serrulatum* from herb. Agardh. It seems to me that there can be no doubt that they agree perfectly with *G. serrulatum* and differ from *G. filicinum* although the two species are certainly closely related.

G. FILICINUM, Bory, Coquille, 162 (1829). — ALBEMARLE ISL.: Iguana Cove, Dec. 30, 1898, *Snodgrass & Heller.* Further distrib. west coast of South America.

But a single specimen was found which may be referred to this species.

GIGARTINA, Stackh.

G. LESSONII, J. Ag. Spec. Alg. ii. 268 (1851). *Sphaerococcus Lessonii*, Bory, Coquille, 171 (1829), excl. syn. — ALBEMARLE ISL.: Elizabeth Bay and Iguana Cove, Feb. 1899, *Snodgrass & Heller.* Further distrib. Peru, Chili.

Most of the specimens were small and sterile, but one had conceptacles which in this species are borne at the base of small branchlets rather than in well-marked papillae as in most species of the genus.

GRACILARIA, Grev.

? G. RUGULOSA, Mont. Pole Sud, 155, Pl. 13, fig. 1 (1845) sub *Hypnea.* — ALBEMARLE ISL.: Iguana Cove. *Snodgrass & Heller.* Further distrib. Australia.

Two specimens with cruciate sporidia which agree well with the description and figure of the habit of this species. Montagne's figure shows sporidia which certainly are not zonate as in *Hypnea*, but may be tripartite, although the figure is not quite clear on that point. The Galapagos alga has cruciate sporidia and hence, in spite of its habit, can be referred only with doubt to Montagne's species.

GYMNOGONGRUS, Mart.

G. GRIFFITHSIAE, var. GALAPAGENSIS, Picc. & Grun. in Piccone (1), 60, & (2), 31. — CHARLES and CHATHAM IDS.: *Marcacci*, acc. to Piccone, ll. cc. Endemic.

G. MELANOTHRIX, Grunow in Piccone (1), 60, & (2), 31. *Gigartina melanothrix*, Bory, Coquille, 152, t. 19, f, 3 (1829.) — CHARLES and CHATHAM IDS.: *Marcacci*, acc. to Piccone, ll. cc. Further distrib. Chili.

G. VERMICULARIS, J. Ag. Spec. Alg. ii. 323 (1851.) *Fucus vermicularis*, Turn. Hist. Fuc. Pl. 221 (1819); Piccone (1), 61. —

CHATHAM ISL.: March, 1884, *Marcacci*, acc. to Piccone, l. c. Further distrib. western So. Am.

HERPOPHYLLON, gen. prov.

Frons membranacea, prostrata, subcircularis vel vague expansa, centro radicibus adfixa. Structura interne cellulis oblongis vel radiatim elongatis, parietibus distincte colloideis cellulis superficiem versus rotundatis in stratum unicum corticale transformatis constituta. Sporangia cruciatim divisa, in soris verrucaeformibus supra frondem sparsa. Cystocarpia ignota.

H. **coalescens**, spec. prov.

Frondes circa 40 mm. diametro, aggregatae, a marginibus coalescentes, thallum indefinite expansum formantes. Sporangia in soris verrucaeformibus ad superficiem superiorem frondis inter paraphyses allata, anguste ovales, 56 μ × 15–20 μ. ALBEMARLE ISL.: Tagus Cove, March, 1899, *Snodgrass & Heller*.

The provisional name given above is adopted to designate a curious alga the cystocarpic fruit of which is unknown and which in other respects does not agree with any genus known to me. When removed from the fluid in which it was preserved it appeared like an irregular, rather cartilaginous pellicle adherent to the substratum by groups of coarse rhizoids. On a closer examination the surface was seen to be ridged, or veined, and apparently the larger specimens are composed of smaller individual fronds which have united, each tuft of rhizoids being in the centre of a frond. The smaller specimens were like the larger, but none seen was so small as to be composed of a single frond. The microscopic structure of the ridges show that they are the lines of union of two different fronds, or, if the whole is to be regarded as a single plant, of its different lobes. The internal structure consists of a compact tissue of large cells about 56 μ in transverse section but more or less elongated in radial sections, some being 140 μ long. They cannot, however, be called filaments. Near the upper and lower surfaces and near the margin the cells become more nearly spherical. The cell-walls are markedly colloidal and near the margin seem to be imbeded in a solid colloidal matrix. The cortical cells are small and arranged in a single layer, especially on the lower surface, those on the upper surface more frequently dividing anticlinically, especially where the sporidia are forming. The latter are in spots on the upper surface, which are sometimes not much raised but at other times form well-marked warts. The sporangia are borne between paraphyses about 60 μ long and 3 μ broad, formed by the out-

growth of cortical cells. It is to be regretted that more is not known as to the mode of growth of the frond. As it is, this alga, although at first sight it suggested *Peyssonnelia rugosa* Harv. in its habit, cannot be referred to that genus, for the frond in section is seen to be symmetrical except that the cortical cells on the under side are more uniformly in a single layer than above, but quite different from the well-defined base of *Peyssonnelia*. Nor can it be considered a prostrate form of *Kallymenia* or *Constantinea*, to which it appears to be more nearly related. It might be suggested that the specimens were abnormal developments of some species with erect fronds, but the abundance of sporidia appear to indicate that the growth was normal.

Hypnea, Lamx.

H. pannosa, J. Ag. Oefv. Kongl. Vet. Akad. Förh. iv. 14 (1847). — Albemarle Isl.: Tagus Cove, Feb. 1889, *Snodgrass & Heller*. Further distrib. tropical seas.

Laurencia, Lamx.

L. obtusa (Huds.) Lamx., var. gracilis, Harv. Ceyl. Alg. 26; Piccone (1), 80. — Chatham Isl.: March, 1884, *Marcacci*, acc. to Piccone, l.c. Further distrib. general.

Lithophyllum, Phil.

* L. Farlowii, Heydrich in Engler, Bot. Jahrb. xxviii. 532, t. 1, f. 6 (1901). — Charles Isl.: *Hassler Exped.* Endemic.

Lithothamnium, Phil.

L. crassum, Phil. Weigm. Arch. 1837, 2, p. 388; Piccone (2), 45. — Charles Isl.: *Marcacci*, acc. to Piccone, l. c.

No specimens of this species have been seen, and I am unable to say whether the alga collected by Marcacci on the Pisani Exp. is the same as the *L. crassum*, originally described from the Mediterranean, as that species is now understood.

Melobesia, Lamx.

M. corticiformis, Kütz. Spec. Alg. 696 (1849). — Wenman Isl.: on *Gelidium serrulatum*, Dec. 1888, *Snodgrass & Heller*. Further distrib. general.

M. pustulata, Lamx. Hist. Polyp. Flex. 315, t. 12, f. 2 (1816); Piccone (1), 65. — Chatham Isl.: (on *Zonaria lobata*) *Marcacci*, acc. to Piccone, l. c. Further distrib. general.

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* Name changed to *L. claudescens*, Heydrich, Ber. deutsch. bot. Ges. xix, 430, as it is antedated by *L. Farlowii*, Foster.

Ochtodes, J. Ag.

O. filiformis J. Ag. Bid. Flor. Syst., 5 (1871), Flor. Morph. Pl. 31, p. 1–8 (1879) ; *Sphaerococcus filiformis* J. Ag. Spec. Alg. ii, 664 (1851). — Wenman Isl.: Dec. 1898, *Snodgrass* & *Heller*. Further distrib. West Indies.

The occurrence of this characteristic but not common West Indian species at the Galapagos is interesting. The few specimens collected have an abundance of cystocarps whose structure together with the peculiar axial structure of the fronds leaves no doubt as to the genus, nor am I able, even in their habit, to recognize any specific distinction between West Indian and Pacific specimens.

Peyssonnelia, Decaisne.

P. rubra J. Ag. Spec. Alg. ii. 502 (1851). *Zonaria rubra* Grev. Trans. Linn. Soc. xv. 340, Pl. III. f. 3 (1827). — Albemarle Isl.: Elizabeth Bay, *Snodgrass* & *Heller*. Further distrib. Mediterranean, Pacific Islands.

Specimens with sporangia, the color altered by the preserving fluid.

Plocamium, Lyngb.

P. coccineum Lyngb. Tent. Hydr. 39, Pl. 9, B. (1819). *Fucus coccineus* Huds. Fl. Angl. ed. 2, 586 (1778). — Wenman Isl., Dec. 1898, *Snodgrass* & *Heller*. Distribution, general.

Rhodymenia (Grev.) J. Ag. Emend.

R. flabellifolia, Mont. Bonite, 105 (1844). *Sphaerococcus flabellifolius*, Bory, Coquille, 174, t. 17 (1829). — Albemarle Isl.: Elizabeth Bay and Iguana Cove, Dec. 30, 1898, *Snodgrass* & *Heller*. Further distrib. Peru, Chili.

All the specimens from Elizabeth Bay and some of those from Iguana Cove have the typical habit of this species. Some of the specimens from the latter locality are more branched than the type but appear to belong to the same species.

HEPATICAE.

By A. W. EVANS.

Bryopteris, Lindenb.

B. filicina (Sw.) Nees, Syn. Hep. 284 (1845). *Jungermannia filicina*, Wilson in Hook. f. (3), 165. — James Isl.: *Darwin.* Widely distributed in tropical America.

B. galapagana, Gottsche, Ann. Sci. Nat. ser. 4, viii. 341 (1857). Listed by Wilson in Hook. f. (3), 165, as *Jungermannia filicina*, var. *tenuis*. — Charles and James Ids.: *Darwin.* Also collected by *Andersson.* The species is endemic but is very close to the following.

B. tenuicaulis, Tayl. Syn. Hep. 285 (1845). — Abingdon Isl.: *Snodgrass* & *Heller.* Chatham Isl.: *Baur.* Known also from the Andes.

Frullania, Raddi.

F. aculeata, Tayl. Lond. Jour. Bot. v. 407 (1846). — Galapagos Ids.: *Darwin.* Also found in the Andes. *Jungermannia pungens*, Wils. in Hook. f. (3), 165, collected on Charles Isl. by *Darwin*, is apparently a synonym of this species.

F. atrata (Sw.) Nees, Syn. Hep. 463 (1845). — Charles Isl.: *Darwin;* 8 Apr. 1888, *Lee.* Duncan Isl.: *Baur.* Widely distributed in tropical America.

F. galapagona, Ångstr. Oefversigt Kongl. Vetensk.-Akad. Förhandl. xxx. no. 5, 116 (1873). — Galapagos Ids.: *Andersson.* Endemic.

F. tamarisci (L.) Dum. Recueil d'Obs. 13 (1835). — This widely distributed species of Europe and North America is quoted by Wilson from Charles Isl.: *Darwin.* The species would hardly be expected from the Galapagos Islands.

F. vaginata (Sw.) Dum. l. c. — Charles and James Ids.: *Darwin.* A Javan species. Its occurrence on the Galapagos Ids. is considered doubtful by Schiffner (cf. Conspect. Hepat. Arch. Ind. 348).

Lopholejeunea (Spruce) Schiffn.

L. Anderssonii, Steph. Hedwigia, xxxv. 108 (1896). — Galapagos Ids.: *Andersson.* Endemic.

Marchesinia, S. F. Gray.

M. brachiata (Sw.) Schiffn. in Engl. & Prantl. Nat. Pflanzenf. i. Abt. 3, 128 (1893). — Duncan Isl.: *Baur*. Widely distributed in tropical America. *Phragmicoma galapagana*, Ångstr. l. c. 114, and *P. nigrescens*, Ångstr. l. c. 115, are very close to this extremely variable species. Both were collected by Andersson.

Notothylas, Sull.

N. orbicularis (Schwein.) Sull. Mem. Am. Acad. new ser. iii. 64, t. 4 (1846). — Albemarle Isl.: Tagus Cove, *Snodgrass & Heller*. Widely distributed in eastern N. Am.; also European.

Omphalanthus, Lindenb. & Nees.

O. filiformis (Sw.) Nees, Syn. Hep. 304 (1845). — Charles and James Ids.: *Darwin*. Widely distributed in tropical America, especially in mountainous regions.

Peltolejeunea (Spruce) Schiffin.

P. galapagona, Steph. Hedwigia, xxxv. 123 (1896). — Charles Isl.: *Andersson*. Endemic.

Plagiochasma, Lehm. & Lindenb.

P. ? — Albemarle Isl.: Iguana Cove, Tagus Cove, and mountain east of Tagus Cove, *Snodgrass & Heller*. Charles Isl.: *Baur*, no. 380 (hb. Harvard Univ.). Narborough Isl.: south side, 615 m. alt., *Snodgrass & Heller*. The specimens are all sterile and indeterminable but seem referable to a single species.

Plagiochila, Dum.

P. Anderssonii, Ångstr. l. c. 114; Rose (1), 138. — Galapagos Ids.: *Andersson*. Chatham Isl.: *A. Agassiz*. Further distrib. Cocos Island of the Pacific.

P. spinifera, Ångstr. l. c. — Galapagos Ids.: *Andersson*. Endemic.

Radula, Dum.

R. retroflexa, Tayl. Lond. Jour. Bot. v. 378 (1846). — Galapagos Ids.: *Andersson*. Also known from the "Pacific Islands," *Nightingale*.

Riccia, Mich.

R. ? Sterile and indeterminable. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*.

MUSCI.

By W. G. FARLOW.

Calymperes, Sw.

C. Sprucei, Bescherelle, Ann. Sci. Nat. Bot. ser. 8, i. 304 (1895). — Bindloe Isl.: *Snodgrass & Heller*. Several specimens of this species were collected. There are no capsules but an abundance of septate gemmae borne on the long club-shaped prolongation of the ribs. As there appeared to be a slight difference between the cell-structure of these specimens and Spruce's no. 20, on which Bescherelle founded his *C. Sprucei*, material of the Galapagos plant was submitted to M. Bescherelle, the learned author of the Essai sur le genre Calymperes, who has been so kind as to verify the identification.

Campylopus, Brid.

C. Anderssonii, Jaeg. Adumb. i. 140 (1870). *C.* sp. Anderss. (1), 125. *Dicranum Anderssonii*, C. Muell. Bot. Zeit. xiv. 169 (1856); Anderss. (2), 37. — Charles Isl.: *Andersson*. Endemic. To judge from the description this must be quite different from the following species.

C. lamellatus, Mont. Ann. Sci. Nat. Bot. ser. 2, ix. 52 (1838) *Dicranum lamellatum*, C. Muell. Syn. Musc. i. 411 (1849). — Albemarle Isl : mountain east of Tagus Cove, alt. 770 m., 1 Feb., and June, 1899, *Snodgrass & Heller*. Further distrib. Bolivia. To this species may be referred a moss collected in small quantity with a marked polytrichoid habit suggesting *C. polytrichoides*, De Not.; Renauld & Cardot, Musci. Eur. no. 114, and *C. leucotrichus*, Sull. & Lesq. Musc. Am. Bor. no. 73 (1856). The stems are from $1\frac{1}{3}$ to 4 cm. high, nearly simple, but in a few cases with lateral innovations just below the tips, which are gemmiferous but without traces of antheridia or archegonia. The erect infolded leaves terminate in long hyaline papillif-erous hairs. The ribs which occupy the greater part of the leaves have a large number, about 30, of dorsal laminae composed of three or four cells seen in section, the terminal cell being obtuse. In well-developed leaves there is in the costal region a single internal layer of squarish colorless cells, 16–18 μ by 14 μ in section, but in older leaves there is developed inside these colorless cells a layer of very narrow small cells. The union by Mitten, Musci. Austro-Americani, of *C. lamellatus*, *C. polytrichoides*, *C. leucotrichus* and a number of other species into a single

species (*C. introflexus* (Hedw.) Mitt.) is incorrect so far as *C. introflexus*, at least, is concerned, as was shown by Duby and C. Mueller, but probably Mitten was justified in uniting some of the species referred to. I am unable to ascertain whether *C. lamellatus* or *C. polytrichoides* was first published since both species were described in 1838. The present species may be referred to *C. lamellatus*, Mont., to which it is at least very closely related, but the scanty and sterile material prevents an accurate determination. The specimens in their leaf structure agree well with the *C. lamellatus* of the Wilkes Expedition in herb. Sullivant.

Daltonia, Hook. & Tayl.

D. robusta, Ångstr. Oefv. 1873, no. 5, p. 117. — Galapagos Ids.: *Andersson*. Endemic.

Macromitrium, Brid.

M. scabrisetum, Wils. in Hook. f. (3), 165; Anderss. (1), 125, & (2), 37. Reduced by Mitten, Jour. Linn. Soc. xii. 210, to *M. longifolium*, Brid. Bryol. Univ. i. 309, 738 (1826), which is *Orthotrichum longifolium*, Hook. Musc. Exot. t. 44 (1818). — Abingdon Isl.: alt. 250 m., 25 June, 1899, *Snodgrass & Heller*. Charles Isl.: *Darwin*. The material secured by Messrs. Snodgrass & Heller consists of a single small specimen with lower leaf cells papillose and rather transparent. The specimen was sterile and the absence of the seta made accurate determination impossible, and furthermore the leaves themselves were not in very good condition, being old and more or less torn.

Papillaria, C. Muell.

P. nigrescens, Jaeg. Adumb. vii. 265 (1876). *Neckera nigrescens*, Schw. Suppl. 3, i. t. 244 (1828); *Anderss.* (1), 125, & (2), 37. — Charles Isl.: *Andersson*. ? James Isl.: *Darwin* ("Neckera vel Pilotrichum sp.?" Hook. f. (3), 165). Neither seen by the writer. Further distrib. general in North and South America.

Pilotrichella, C. Muell.

P. Anderssonii, Jaeg. Adumb. vii. 262 (1876). *Neckera Anderssonii*, C. Muell. Bot. Zeit. xiv. 170 (1856); Anderss. (2), 37. — Charles Isl.: *Andersson*. Endemic. Not seen by the writer.

P. nigricans, Besch. Prodr. Bry. Mex. 79. *Hypnum nigrescens*, Hook. in Kunth, Syn. Pl. Equin. i. 64 (1822). — Galapagos Ids.:

Andersson, vid. Ångström in Oefv. k. Vet. Akad. Förh. xxx. 118 (1873).

Schlotheimia, Brid.

S. Jamesoni, Brid. Bryol. Univ. i. 742 (1826). *Orthotrichum Jamesoni*, Arn. Trans. Wern. Soc. v. 201 (1824). — Albemarle Isl.: Iguana Cove, 30 Dec. 1898, *Snodgrass & Heller*. Further distrib. Brazil. The specimens referred to this species were sterile. The leaf structure agrees so well with that of *S. Jamesoni* in herb. Taylor that the name may be retained here. The relations of *S. Jamesoni* to *S. nitida*, Schwaeg., are not well defined and in herb. Sullivant the *S. Jamesoni* of the Wilkes Expedition was later considered to be *S. nitida*.

FILICES.

Acrostichum, L.

A. aureo-nitens, Hook. Ic. Pl. x. t. 933 (1854), & Sp. Fil. v. 270 (1864); Anderss. (1), 131, & (2), 42; Hook. & Bak. Syn. Fil. 421 (1868). *Hemionitis pinnata*, Hook. f. (3), 167, excellently described, yet neglected by most subsequent authors; Andersson (1), 129, & (2), 40. *Neurocallis aureo-nitens*, Moore, Ind. Fil. 5 (1857). *Chrysodium aureo-nitens*, Christ, Farnkr. 47 (1897). *Elaphoglossum aureo-nitens*, Diels in Engl. & Prantl, Nat. Pflanzenf. i. Abt. 4, 334, f. 174 H. (1899). — Galapagos Ids.: *Cuming*, no. 109. Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 17 (hb. Gr.); on mountain east of Tagus Cove, alt. 920 m., *Snodgrass & Heller*, no. 229 (hb. Gr.). Charles Isl.: *Darwin; Andersson; Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 356 (hb. Gr.). Chatham Isl.: *Capt. Wood*. Narborough Isl.: southern part, *Snodgrass & Heller*, no. 319 (hb. Gr.). Further distrib. Ecuador, acc. to Diels. l. c. A fern of remarkable and characteristic habit, the sterile fronds spatulate and entire, the fertile pinnate.

A. aureum, L. Sp. 1069 (1753); Schk. Fil. t. 1; Hook. Sp. Fil. v. 266. *Chrysodium aureum*, Mett. Fil. Lips. 21 (1856). — Galapagos Ids.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. general in trop. and subtrop. reg.

A. muscosum, Sw. Fl. Ind. Occ. 1591 (1806), & Syn. Fil. 10; Hook. Sp. Fil. v. 231. *A. Langsdorfii*, Hook. & Grev. Ic. t. 164 (1831). *Elaphoglossum muscosum*, Moore, Ind. Fil. 12, 362 (1862). *Olfersia muscosa*, Presl, Tent. Pterid. 233 (1836). *O. Langsdorfii*, Presl, l. c. 234; Hook. f. (3), 167; Anderss. (1), 128, & (2), 39. —

James Isl.: *Darwin*, acc. to Hook. f., l. c. Not secured by subsequent collectors in the Galapagos Ids. Further distrib. Mex. (acc. to Hook. & Bak.), W. Ind. to Peru and Brazil.

A. viscosum, Sw. Syn. Fil. 10, 193 (1806); Hook. & Grev. Ic. t. 64; Hook. Sp. Fil. v. 220. *Elaphoglossum viscosum*, Schott acc. to Moore, l. c. 369. *Olfersia viscosa*, Presl, l. c. *O. viscida*, Presl acc. to Hook. f. (3), 167; Anderss. (1), 129, & (2), 39. — James Isl.: *Darwin*, acc. to Hook. f., l. c. Not since collected on the Galapagos Ids. Further distrib. Mex., W. Ind., S. Am., E. Ind., etc.

Adiantum, L.

A. aethiopicum, L. Sp. ed. 2, 1560 (1763); Hook. Sp. Fil. ii. 37, t. 77 A; Moore, Ind. Fil. 19. —Galapagos Ids.: acc. to Moore, l. c. Further distrib. general in trop.

A. concinnum, Humb. & Bonpl. in Willd. Sp. v. 451 (1810); HBK. Nov. Gen. & Sp. i. 20, t. 668 (1815); Hook. Sp. Fil. ii. 42. *A cuneatum*, Hook. f. (3), 168; Anderss. (1), 129, & (2), 40; not Langsd. & Fisch. — Abingdon Isl.: alt. 520 m., *Snodgrass* & *Heller*, no. 818 (hb. Gr.). Albemarle Isl.: north mountain, Elizabeth Cove, *Snodgrass* & *Heller*, no. 282 (hb. Gr.); Iguana Cove, *Snodgrass* & *Heller*, no. 15 (hb. Gr.); Tagus Cove, abundant from the sea-level to 950 m. alt., *Snodgrass* & *Heller*, no. 182 (hb. Gr.). James Isl.: *Scouler*; *Darwin*; common on lava rocks, *Snodgrass* & *Heller*, no. 361 (hb. Gr.). Narborough Isl.: southern part, abundant in shade, alt. 310 to 620 m., *Snodgrass* & *Heller*, no. 320 (hb. Gr.). The last number has broader, flatter sori and its identity with the others is somewhat doubtful. Further distrib. Mex., W. Ind. to Peru and Brazil.

A. Henslovianum, Hook. f. (3), 169; Anderss. (1), 129, & (2), 40; Hook. & Bak. Syn. Fil. 118; Rob. & Greenm. (1), 149. *A. sessilifolium*, Hook. Sp. Fil. ii. 44, t. 85. — Charles Isl.: *Darwin*. Chatham Isl.: southwest end, middle region, *Baur*, no. 361 (hb. Gr.). James Isl.: *Darwin*. Further distrib. Andean S. Am.

A. incisum, Presl, Rel. Haenk. i. 61, t. 10, f. 3 (1830), & Tent. Pterid. 157; Hook. Syn. Fil. ii. 28; Moore, Ind. Fil. 28. — Galapagos Ids.: acc. to Moore, l. c., and Christ, Farnkr. 138. Further distrib. Pacific slope of northern S. Am. and S. Mex.

A. Kaulfussii, Kunze, Linnaea, xxi. 221 (1848); Moore, Ind. Fil. 29. — "Chatham Isl." [presumably of the Galapagos group] acc. to Moore, l. c. Further distrib. northern S. Am., Mex., W. Ind.

A. PARVULUM, Hook. f. (3), 168; Anderss. (1), 129, & (2), 40; Hook. Sp. Fil. ii. 44. — CHARLES ISL.: *Darwin*. A species not secured by any subsequent collector, and omitted by Hook. & Bak. from their Syn. Fil. Endemic so far as known.

A. PATENS, Willd. Sp. v. 439 (1810); Hook. Sp. Fil. ii. 29, t. 87 A; Hook. & Bak. Syn. Fil. 126. — GALAPAGOS IDS.: acc. to Moore, l. c., and Hook. & Bak. l. c. Further distrib. Mex. to Ecuador.

A. PRIONOPHYLLUM, HBK. Nov. Gen. & Sp. i. 20 (1815); Hook. Sp. Fil. ii. 22; Moore, Ind. Fil. 34. — CHATHAM ISL.: acc. to Moore. Further distrib. Mex., W. Ind., northern S. Am.

ASPIDIUM, SW.

A. CORIACEUM, Sw. Syn. Fil. 57 (1806); Willd. Sp. Pl. v. 268; Hook. Sp. Fil. iv. 32; Schk. Fil. 50, t. 50. *A. capense*, Willd. l. c. 267 (1810); Hook. & Bak. Syn. Fil. 254. *Polypodium coriaceum*, Sw. Prodr. 133 (1788). *Polystichum coriaceum*, Schott, Gen. Fil. t. 9 (1834); Presl, Tent. Pterid. 84; Hook. f. (3), 171; Anderss. (1), 131, & (2), 41. — JAMES ISL.: *Darwin*, acc. to Hook. f., l. c. Apparently not since collected on the islands. Further distrib. W. Ind., S. Am., Trop. of Old World.

A. SEMICORDATUM, Sw. Syn. Fil. 45 (1806); Hook. Sp. Fil. iv. 16, which see for synon. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. W. Ind. to Peru and Brazil. Varieties also in the Old World.

ASPLENIUM, L.

A. ANISOPHYLLUM, var. LATIFOLIUM, Hook. Sp. Fil. iii. 111 (1860). *A. nigrescens*, Hook. f. (1), 170; Anderss. (1), 131, & (2), 41; not Bl. *A. nubilum*, Moore, Ind. Fil. 150 (1859). — GALAPAGOS IDS.: *Capt. Wood*. JAMES ISL.: *Darwin*. Further distrib. trop. Am. and Afr.

A. AURITUM, Sw. Fl. Ind. Occ. 1616 (1806); Hook Sp. Fil. iii. 178; Rob. & Greenm. (1), 149. *A. marinum*, var. *auriculatum*, Hook. f. (3), 170; Anderss. (1), 131, & (2), 41. — ABINGDON ISL.: *Snodgrass & Heller*, no. 835 (hb. Gr.). CHARLES ISL.: *Darwin*; in the upper shaded region, *Andersson*; *A. Agassiz*. CHATHAM ISL.: *Capt. Wood*, acc. to Hook. l. c.; on the southwest end, middle region, *Baur*, no. 354 (hb. Gr.). JAMES ISL.: *Darwin*. Further distrib. Mex., W. Ind., S. Am. Capt. Wood's plant stated by Hook. to be partially bipinnate, is probably the one which Moore (Ind. Fil. 170) doubtfully refers to the Galapagos Ids. under the name of *A. sulcatum*, Lam.

Var. MACILENTUM, Moore, Ind. Fil. 115 (1859); Hook. Sp. Fil. iii. 179. — GALAPAGOS IDS.: acc. to Moore, l. c. Further distrib. Mex., W. Ind., trop. S. Am.

A. CICUTARIUM, Sw. Prodr. 130 (excl. syn.); Hook. Sp. Fil. iii. 198; Lowe, Nat. Hist. Ferns, v. t. 20; Rob. & Greenm. (1), 149. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. CHATHAM ISL.: acc. to Moore, Ind. Fil. 119; southwest end, middle region, *Baur*, no. 359 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am., Afr.

A. FORMOSUM, Willd. Sp. v. 329 (1810); Hook. Sp. Fil. iii. 143, & Fil. Exot. t. 16. *A. subalatum*, Hook. & Arn. Bot. Beech. 312, t. 71. *A. subulatum*, Hook. f. (3), 169; Anderss. (1), 130, & (2), 41. *A. farinosum*, Rob. & Greenm. (1), 149, by typographical error. — ABINGDON ISL.: alt. 540 m., *Snodgrass & Heller*, no. 819 (hb. Gr.). ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 27 (hb. Gr.); on mountain east of Tagus Cove, *Snodgrass & Heller*, no. 240 (hb. Gr.). CHARLES ISL.: *Darwin; Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 366 (hb. Gr.). CHATHAM ISL.: *Capt. Wood; Cuming*, no. 108, acc. to Hook. Sp. Fil. iii. 143. Further distrib. general in trop. of both hemispheres.

A. FURCATUM, Thunb. Prodr. Fl. Cap. 172 (1800); Hook. Sp. Fil. iii. 165; Hook. f. (3), 169; Anderss. (1), 130, & (2), 41. *A. praemorsum*, Sw. Fl. Ind. Occ. iii. 1620 (1806); Moore, Ind. Fil. 155. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. ALBEMARLE ISL.: on mountain east of Tagus Cove, *Snodgrass & Heller*, no. 239 (hb. Gr.). JAMES ISL.: *Darwin*. Further distrib. general in trop. of both hemispheres.

A. LAETUM, Sw. Syn. Fil. 79, 271 (1806); Hook. Sp. Fil. iii. 133. *A. abscissum*, Willd. Sp. v. 321 (1810), in part. — CHATHAM ISL.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. general in trop. Am.

A. LUNULATUM, Sw. Syn. Fil. 80 (1806); Hook. & Bak. Syn. Fil. 202. *A. erectum*, Bory in Willd. Sp. v. 328 (1810); Hook. Sp. Fil. iii. 126. — CHARLES ISL.: *Lee* (hb. U. S. Nat. Mus.). Widely distrib. in trop. reg.

A. RHIZOPHYLLUM, Kunze, Linnaea, ix. 71; Hook. Sp. Fil. iii. 200; not L. *A. Macraei*, Hook. & Grev. Ic. 217 (acc. to Hook. l. c.), and hence (if rightly identified) Hook. f. (3), 169, and Anderss. (1), 131, & (2), 41. ? *A. myriophyllum*, var. *divaricatum*, Moore, Ind. Fil. 148, as to pl. Galapagos. *Darea rhizophylla* & *Caenopteris rhizophylla*, Hook. & Grev. Ic. t. 193. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. JAMES ISL.: *Darwin*, acc. to Hook. f., l. c. Not secured on the

Islands by recent collectors. Further distrib. general in trop. of both hemispheres.

A. RUTACEUM, Metten. Asplen. 129, t. 5, f. 32–33 (1859); Hook. Sp. Fil. iii. 203; Hook. & Bak. Syn. Fil. 220. — GALAPAGOS IDS.: acc. to Hook. & Bak. l. c., where no collector is mentioned. Further distrib. trop. S. Am.

A. SERRA, Langsd. & Fisch. Fil. 16, t. 16 (1810–1818); Hook. Sp. Fil. iii. 154; Moore, Ind. Fil. 166. — GALAPAGOS IDS.: acc. to Moore, l. c. Further distrib. trop. Am.

A. SERRATUM, L. Sp. 1079 (1753); Hook. Sp. Fil. iii. 81; Moore, Ind. Fil. 167. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. CHATHAM ISL.: acc. to Moore. Further distrib. general in trop. Am.

BLECHNUM, L.

B. OCCIDENTALE, L. Sp. ed. 2, 1534 (1763); Sw. Syn. Fil. 113; Jacq. Ic. Pl. Rar. iii. t. 644; Hook. f. (3), 169; Anderss. (1), 130, & (2), 41; Caruel (1), 625. *B. orientale*, L. Sp. 1077 (1753), through clerical or typographical transposition of names with the Asiatic species, an error corrected by Linnæus himself. — GALAPAGOS IDS.: acc. to Moore, Ind. Fil. 200. ABINGDON ISL.: *Snodgrass & Heller*, no. 815 (hb. Gr.). ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 19 (hb. Gr.), 134 (hb. Gr.); mountains east of Tagus Cove, alt. 920 m., *Snodgrass & Heller*, no. 247 (hb. Gr.). CHARLES ISL.: in the upper shaded regions, *Andersson*. CHATHAM ISL.: *Chierchia; Baur*, no. 360 (hb. Gr.). JAMES ISL.: *Darwin*. Further distrib. Mex. to Chili, Brazil, and W. Ind.

Var. CAUDATUM, Hook. Sp. Fil. iii. 51 (1860). — GALAPAGOS IDS.: *Capt. Wood*, acc. Hook. l. c., and Moore, l. c. Further distrib. general in trop. Am. and Philippines.

CHEILANTHES, SW.

C. MICROPHYLLA, Sw. Syn. Fil. 127 (1806); Hook. Sp. Fil. ii. 84, t. 98 A; Hook. & Bak. Syn. Fil. 135; Rob. & Greenm. (1), 149. *C. heterotrichus*, Anderss. (1), 129, & (2), 40, to judge from character. — GALAPAGOS IDS.: acc. to Moore, Ind. Fil. 247. — ALBEMARLE ISL.: on hillsides near Iguana Cove, *Snodgrass & Heller*, nos. 20 (hb. Gr.), 114 (hb. Gr.). CHARLES ISL.: in shade near summit of mountain, *Andersson* (*C. heterotrichus*). CHATHAM ISL.: southwest end, middle region, *Baur*, no. 369 (hb. Gr.). Further distrib., Mex., Andes of Peru, and Bolivia.

C. MYRIOPHYLLA, Desv. Berl. Mag. v. 328, & Jour. Bot. ii. 44, t. 13, f. 1 (1813); Hook. Sp. Fil. ii. 100. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 12 (hb. Gr.). Further distrib. Mex., Andes, Ecuador to Peru.

CYSTOPTERIS, Bernh.

C. FRAGILIS, Bernh. in Schrad. Neues Jour. Bot. i. pt. 2, 26, 49, t. 2. f. 9 (1806); Wolf (1), 283. — CHARLES ISL.: acc. to Wolf. Of wide distribution. I can but question the identity of the Galapageian plant. The species has been secured on the islands by no other collector, and the specimen in question received only a field determination.

GLEICHENIA, Sm.

G. DICHOTOMA, Hook. Sp. Fil. i. 12 (1846); Moore, Ind. Fil. 375. — GALAPAGOS IDS.: acc. to Moore, l. c. Further distrib. general in trop.

GYMNOGRAMME, Desv.

G. CHAEROPHYLLA, Desv. Jour. Bot. i. 26 (1813); Hook. Sp. Fil. v. 136; Hook. & Grev. Ic. Fil. t. 45; Hook. f. (3), 168 (*Gymnogramma*); Anderss. (2), 40. — CHARLES ISL.: *Darwin*. It is not unlikely that a reëxamination will show this specimen to be *G. leptophylla*, Desv., since discovered upon the same island by Baur. Further distrib. Mex., W. Ind., Brazil, Paraguay.

G. LEPTOPHYLLA, Desv. Jour. Bot. i. 26 (1813); Hook. Sp. Fil. v. 136; Hook. & Grev. Ic. Fil. t. 25; Rob. & Greenm. (1), 149. — CHARLES ISL., *Baur*, no. 368 (hb. Gr.). Further distrib. trop. of both hemispheres.

G. TARTAREA, Desv. Berl. Mag. v. 305; Hook. Sp. Fil. v. 148; Caruel (1), 625. *G. dealbata*, Link, Hort. Berol. ii. 52 (1833). *G. calomelanos*, Rob. & Greenm. (1), 149, not Kaulf. — ALBEMARLE ISL: Iguana Cove, *Snodgrass & Heller*, no. 25 (hb. Gr.); on mountain east of Tagus Cove, *Snodgrass & Heller*, no. 241 (hb. Gr.). BINDLOE ISL.: *Snodgrass & Heller*, no. 782 (hb. Gr.), the yellow-powdered form, ? no. 778 (hb. Gr.), a juvenile state. CHATHAM ISL., *Chierchia;* southwest end, upper region, *Baur*, no. 362 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am., Tropics of the Old World.

HYPOLEPIS, Bernh.

H. REPENS, Presl, Tent. Pterid. 162 (1836); Hook. Sp. Fil. ii. 64, t. 90 B. *Lonchitis repens*, L. Sp. 1078 (1753). *Cheilanthes repens*,

Kaulf. Enum. Fil. 215 (1824). — Galapagos Ids.: *Capt. J. Wood*, acc. to Hook. l. c. Further distrib. Mex., W. Ind., trop. S. Am.

Nephrodium, Rich.

N. brachyodon, Hook. Sp. Fil. iv. 83 (1862); Hook. & Bak. Syn. Fil. 295. — Galapagos Ids.: *Capt. Wood.* Further distrib. W. Ind., S. Am., Malayan Penin. & Isles.

N. macrophyllum, Bak. Syn. Fil. 300. *Aspidium macrophyllum*, Sw. Syn. Fil., 43, 239 (1806); Hook. Sp. Fil. iv. 55. — Galapagos Ids.: *Capt. Wood*, acc. to Hook., l. c. Further distrib. general in trop. Am.

N. molle, Desv. Mém. Soc. Linn. vi. 258 (1827); Schott, Gen. Fil. t. 10 (1834); Hook. f. (3), 171; Anderss. (1), 131, & (2), 41; Hook. & Bak. Syn. Fil. 293. *Aspidium molle*, Sw. Syn. Fil. 49 (1806); Rob. & Greenm. (1), 149. — Albemarle Isl.: common at 460 m., above Iguana Cove, *Snodgrass & Heller*, nos. 18 (hb. Gr.), 115 (hb. Gr.). Charles Isl.: *Lee* (hb. U. S. Nat. Mus.); *Baur.* James Isl.: *Darwin.* Further distrib. Mex., W. Ind., S. Am., Tropics of Old World.

N. unitum, R. Br. Prodr. Fl. Nov. Holl. 148 (1810); Hook. & Bak. Syn. Fil. 289; Caruel (1), 625. — Chatham Isl.: *Chierchia.* Further distrib. tropics of both hemispheres.

N. villosum, Presl, Rel. Haenk. i. 38 (1830); Hook. Sp. Fil. iv. 134. *Polypodium villosum*, L. Sp. 1093 (1753). *P. Berteroanum*, Hook. Sp. Fil. iv. 269, not Spreng. *Aspidium villosum*, Sw. Syn. Fil. 56 (1803). — Chatham Isl.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. W. Ind. to Chili.

Nephrolepis, Schott.

N. acuta, Presl, Tent. Pterid. 79 (1836); Hook. Sp. Fil. iv. 153. *Aspidium acutum*, Schk. Fil. 32, t. 31. — Bindloe Isl.: *Snodgrass & Heller*, no. 779 (hb. Gr.). Although the specimens are sterile the somewhat characteristic venation and contour of the pinnae leave no doubt of the identity of this species, which appears not to have been hitherto recorded from the islands. Further distrib. Mex., W. Ind., S. Am., Tropics of Old World.

N. pectinata, Schott, Gen. Fil. under t. 3 (1834). *N. cordifolia* β, Hook. & Bak. Syn. Fil. 300 (1868). *N. cordifolia*, Rob. & Greenm. (1), 149. *Aspidium pectinatum*, Willd. Sp. Pl. 223 (1810). *Nephrodium pectinatum*, Hook. f. (3), 170; Anderss. (1), 131, & (2), 41.

— CHATHAM ISL.: southwest end, upper region, *Baur*, no. 357 (hb. Gr.). JAMES ISL.: *Darwin*. This smooth-stiped fibrous-rooted fern, with short blunt oblong pinnae, cannot be very satisfactorily placed (as by Hook. & Bak. l. c.) in *N. cordifolia*, Presl, which has tuberous roots, scaly stipes, and triangular often acutish pinnae. Further distrib. Panama, W. Ind., S. Am.

NOTHOCHLEANA, R. Br.

N. SULPHUREA, J. Sm. in Seem. Bot. Herald, 233 (1852–57); Hook. & Bak. Syn. Fil. 373. *N. candida*, Hook. Sp. Fil. v. 110 (1864). *N. argentea*, Lowe, Ferns Brit. and Exot. i. t. 55 (1856). *Pteris lutea*, Hook. f. (3), 168; Anderss. (1), 129, & (2), 40; not Cav. — GALAPAGOS IDS.: *Cuming*, no. 110, acc. to Hook. l. c. ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 23 (hb. Gr.); north mountain, Elizabeth Bay, *Snodgrass & Heller*, no. 287 (hb. Gr.); mountain east of Tagus Cove, altitude 925 m., *Snodgrass & Heller*, no. 246 (hb. Gr.). JAMES ISL.: *Scouler*. Further distrib. S. W. United States, Mex., Andean S. Am.

PELLAEA, Link.

P. GERANIAEFOLIA, FÉE, Gen. Fil. 130 (1850–1852); Hook. Sp. Fil. ii. 132; Hook. & Bak. Syn. Fil. 146. *Pteris geraniifolia*, Hook. Ic. Pl. x. t. 915 (1854). — GALAPAGOS IDS.: *Douglas*, acc. to Hook. Sp. Fil. ii. 133. Further distrib. general in trop. reg. Strikingly like *Pteris pedata*, L., but with free veinlets.

POLYPODIUM, L.

P. ANGUSTIFOLIUM, Sw. Syn. Fil. 27 (1806); Raddi, Fil. Bras. 14, t. 24, f. 2. *P. ensifolium*, Willd. Sp. Pl. v. 152 (1810). *Marginaria ensifolia*, Presl, Tent. Pterid. 188 (1836); Hook. f. (3), 167; Anderss. (1), 127, & (2), 39. — JAMES ISL.: *Darwin*, acc. to Hook. f., l. c., an occurrence apparently doubted by Andersson and not subsequently confirmed by more recent collectors. Further distrib. Mex., W. Ind., S. Am.

P. AUREUM, L. Sp. 1087 (1753); Lowe, Ferns Brit. and Exot. ii. t. 56; Hook. Sp. Fil. v. 16. *Pleopeltis aurea*, Presl, Tent. Pterid. 193 (1836); Hook. f. (3), 167; Anderss. (1), 128, & (2), 39. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. JAMES ISL.: *Darwin*, acc. to Hook. f. (3), 167. This large and conspicuous species, secured by these early collectors on the Galapagos Ids., has curiously eluded the subsequent

and much more thorough collectors who have visited the archipelago. Further distrib. Southern U. S., Mex., W. Ind., S. Am., "Australia."

P. CRASSIFOLIUM, L. Sp. 1083 (1753); Hook. Sp. Fil. v. 62; Hemsl. Biol. Cent.-Am. Bot. iii. 656; N. E. Brown, Trans. Linn. Soc. ser. 2, vi. 85. *P. coriaceum*, Raddi, Fil. Bras. 16, t. 25. *Pleuridium crassifolium*, Fée, Gen. Fil. 273. — GALAPAGOS IDS.: *Capt. Wood* (hb. Kew). Further distrib. Mex., W. Ind. to Peru and Brazil.

P. INCANUM, Sw. Prodr. 131 (1788); Hook. Sp. Fil. iv. 208. *Acrostichum polypodioides*, L. Sp. 1068 (1753). *Marginaria incana*, Presl, Tent. Pterid. 188 (1836); Hook. f. (3), 166; Anderss. (1), 127, & (2), 38 (where *P. incisum*, Sw., is incorrectly given as a synonym, instead of the correct *P. incanum*, Sw.). — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. ALBEMARLE ISL.: *Macrae*. CHARLES ISL.: *Darwin*. Further distrib. U. S., Mex., W. Ind., S. Am., Trop. Afr.

P. LANCEOLATUM, L. Sp. 1082 (1753). *P. macrocarpum*, Willd. Sp. Pl. v. 147 (1810). *P. lepidotum*, Willd. in Schlecht. Adumbr. 17, t. 8 (1825). *Pleopeltis ensifolia*, Hook. Ex. Fl. t. 62 (1823). *P. macrocarpa*, Kaulf. Enum. Fil. 245 (1824); Hook. f. (3), 167; Anderss. (1), 127, & (2), 39. *P. lanceolata*, Presl, Tent. Pterid. 193 (1836); Anderss. (1), 128, & (2), 39. *P. lepidota*, Hook. f. (3), 167; Anderss. (1), 126, & (2), 39. *Lepicystis lanceolata*, Diels in Engl. & Prantl, Nat. Pflanzenf. i. Abt. 4, 323 (1899). — ALBEMARLE ISL.: Iguana Cove, on trees and bushes, alt. 310 m., *Snodgrass & Heller*, no. 127 (hb. Gr.). CHARLES ISL.: *Darwin*; in upper shaded region, *Andersson*. JAMES ISL.: *Darwin*. Further distrib. trop. of both hemispheres.

P. LEPIDOPTERIS, Kunze, Linnaea, xiii. 132 (1839); Hook. Sp. Fil. iv. 211; Hook. & Bak. Syn. Fil. 346. *Acrostichum lepidopteris*, Langsd. & Fisch. Fil. i. 5, t. 2 (1810). — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook., l. c. Further distrib. general in trop. Am.

P. LORICEUM, L. Sp. 1086 (1753); Hook. Sp. Fil. v. 21. *P. punctulatum*, Hook. Ic. Pl. t. 720 (1848). *Goniophlebium loriceum*, J. Sm. in Hook. Gen. Fil. under t. 51 (1838); Moore, Ind. Fil. 392. — GALAPAGOS IDS.: acc. to Moore, l. c. Further distrib. general in trop. Am.

P. PALEACEUM, Hook. f. (3), 166; ? Anderss. (1), 126, & (2), 38; ? Hook. Sp. Fil. iv. 261. ? *Alsophila* sp., Rob. & Greenm. (1), 149. — CHARLES ISL.: *Darwin*. JAMES ISL.: *Darwin*. Endemic. To this species I would doubtfully refer specimens from ALBEMARLE ISL., Iguana Cove, *Snodgrass & Heller*, no. 113 (hb. Gr.); CHARLES ISL., *Andersson, Lee* (hb. U. S. Nat. Mus.); and CHATHAM ISL., southwest

end, middle region, *Baur*, no. 367 (hb. Gr.). These plants, none of which is in quite satisfactory condition, represent one, or perhaps several, very nearly related species close to *P. punctatum*, Thunb., and *P. prasinum*, Baker.

P. PECTINATUM, L. Sp. 1085 (1753); Hook. Sp. Fil. iv. 203; Caruel (1), 625. *P. paradisiae*, Langsd. & Fisch. Ic. Fil. 11, t. 11 (1810–1818); Hook. f. (3), 165; Andersson (1), 126, & (2), 38; Rob. & Greenm. (1), 149. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 14 (hb. Gr.), 133 (hb. Gr.). CHARLES ISL.: *Andersson*. CHATHAM ISL.: *Chierchia;* southwest end, middle region, *Baur*, no. 358 (hb. Gr.). JAMES ISL.: *Darwin*. Further distrib. Mex., W. Ind., S. Am.

P. PERCUSSUM, Cav. Prael. 243 (1801); Sw. Syn. Fil. 26; Hook. Fil. Exot. t. 59, & Sp. Fil. v. 55. *P. cuspidatum*, Presl, Rel. Haenk. 20, t. 1, f. 3 (1825). *Lepicystis percussa*, Diels in Engl. & Prantl, Nat. Pflanzenf. i. Abt. 4, 323 (1899). — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. Fil. Exot. l. c. This fern does not appear to have been secured by any recent collector in the Galapagos Islands. Further distrib. trop. S. Am.

P. PHYLLITIDIS, L. Sp. 1083 (1753); Hook. Sp. Fil. v. 38. *Campyloneurum Phyllitidis*, Presl, Tent. Pterid. 190 (1836); Hook. f. (3), 167; Anderss. (1), 128, & (2), 39. — JAMES ISL.: *Darwin*, acc. to Hook. f. (3), 167. Not secured by more recent collectors. Further distrib. trop. Am.

P. PLEIOSORUM, Hook. f. (3), 166 (as *pleiosoros*); Anderss. (1), 126, & (2), 38 (as *Pleiosoros*). — JAMES ISL.: *Darwin*. Endemic. This species is briefly referred to by Hook. Sp. Fil. iv. 262, where treated as an unrecognizable and therefore negligible synonym. Nevertheless the original characterization is sufficiently detailed to show that the plant was distinct from any other Galapageian species unless it be *P. paleaceum*, Hook. f. The type will probably be found in the Darwin collection at the herbarium of Cambridge University.

P. RUDE, Kunze, Linnaea, xiii. 133 (1839); Hook. Sp. Fil. iv. 243. — GALAPAGOS IDS.: *Capt. Wood*? acc. to Hook. l. c. Further distrib. Mex. to Peru and Brazil.

P. SQUAMATUM, L. Sp. 1086 (1753); Hook. Sp. Fil. iv. 209; Rob. & Greenm. (1), 149. *P. tridens*, Kunze, Farnkr. i. 23, t. 13, f. 1 (1840). *Pleopeltis* sp., Anderss. (1), 128, & (2), 39. *Lepicystis squamata*, J. Sm. acc. to Diels in Engl. & Prantl, Nat. Pflanzenf. i. Abt.

4, 323 (1899). — Galapagos Ids.: *Cuming*, no. 112; *Habel*, acc. to Hemsl. in litt.* Abingdon Isl.: *Snodgrass & Heller*, no. 814 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 13 (hb. Gr.); mountain east of Tagus Cove, alt. 770 m., *Snodgrass & Heller*, nos. 238 (hb. Gr.), 900 (hb. Gr.). Bindloe Isl.: *Snodgrass & Heller*, no. 783 (hb. Gr.). Charles Isl.: in the upper region, *Andersson; Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 373 (hb. Gr.). Chatham Isl.: *Capt. Wood; Snodgrass & Heller*, no. 499 (hb. Gr.); southwestern end, upper region, *Baur*, no. 370 (hb. Gr.). Duncan Isl.: *Baur*, no. 372 (hb. Gr.); *Snodgrass & Heller*, no. 705 (hb. Gr.). Narborough Isl.: southern part, *Snodgrass & Heller*, no. 324 (hb. Gr.). Further distrib. Peru to Mex., and W. Ind.

P. sp. — Wenman Isl.: acc. to ms. notes of Mr. Heller an undetermined species of *Polypodium* was observed in a cave. The matter is of interest since it is the first case in which a fern has been reported from any of the lower islands.

Pteris, L.

P. aquilina, var. esculenta, Hook. f. Fl. Nov. Zeal. ii. 25 (1855); Hook. Sp. Fil. ii. 197. *P. esculenta*, Forst. Prodr. 79 (1786); Schkuhr, Fil. t. 97. *P. aquilina*, var. *caudata*, Rob. & Greenm. (1), 149, not Hook. — Galapagos Ids.: *Capt. Wood*, acc. to Hook. Albemarle Isl.: 320 m. above Iguana Cove, *Snodgrass & Heller*, nos. 866, 867 (both in hb. Gr.). Chatham Isl.: southwest end, upper region, *Baur*, no. 363 (hb. Gr.). Generally distrib. in trop.

P. incisa, Thunb. Fl. Cap. 733 (1823); Hook. Sp. Fil. ii. 230. *P. pallida*, Raddi, Fil. Bras. 49, t. 71 (1825). — Galapagos Ids.: *Capt. Wood*, acc. to Hook. l. c.

P. pedata, L. Sp. ed. 2, 1532 (1763); Hook. & Bak. Syn. Fil. 167. *Litobrochia pedata*, Presl, Tent. Pterid. 149 (1836); Hook. f. (3), 168; Anderss. (1), 129, & (2), 40 (*Lithobrachia*). — Galapagos Ids.: *Cuming*, no. 107; *Capt. Wood*. Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 22 (hb. Gr.), 24 (hb. Gr.). Charles Isl.: *Darwin; Andersson; Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 364 (hb. Gr.). Chatham Isl.: southwest end, middle region, *Baur*, no. 365 (hb. Gr.). James Isl.: *Darwin; Douglas; Cuming*. Further distrib. W. Ind., S. Am.

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* This and all following references to the plants of Dr. Habel are based upon a list preserved at the Royal Gardens, Kew, a transcription of this list having been kindly forwarded to the writer by Mr. W. Botting Hemsley.

P. PROPINQUA, var. CUMINGIANA, Ag. Sp. Gen. Pterid. 65; Hook. Sp. Fil. ii. 223. — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. Venezuela to Mex., Trinidad. This species is by Hook. & Bak. (Syn. Fil. 171) regarded as a form of *P. aculeata*, Sw.

TAENITIS, Sw.

T. ANGUSTIFOLIA, R. Br. Prodr. 154, in note (1810); Hook. Sp. Fil. v. 187; Hook. & Bak. Syn. Fil. 396. *Vittaria costata*, Kunze, Analect. Pterid. 29, t. 18, f. 2, also f. 1, *a* and *b* (1837). — GALAPAGOS IDS.: *Capt. Wood*, acc. to Hook. l. c. Further distrib. W. Ind., Colombia to Brazil.

SALVINIACEAE.

AZOLLA, Lam.

A. CAROLINIANA, Willd. Sp. Pl. v. 541 (1810); Anderss. (1), 132, & (2), 42. — CHARLES ISL.: in cold spring of the middle region, *Andersson*.

SALVINIA, L.

S. sp., Wolf (1), 284. — CHARLES ISL.: in brooks near hacienda, acc. to Wolf, l. c.

LYCOPODIACEAE.

LYCOPODIUM, L.

L. CLAVATUM, L. Sp. 1101 (1753); Rob. & Greenm. (1), 149. — CHATHAM ISL.: southwest end, upper region, *Baur*, no. 375 (hb. Gr.). Of wide distribution.

L. DICHOTOMUM, Jacq. Enum. Vindob. 314 (1762), & Hort. Vindob. iii. 26, t. 45; Spring, Monog. Lycop. i. 41, ii. 18; Hemsl. Biol. Cent.-Am. Bot. iii. 701; Bak. Fern-allies, 16. *L. pithyoides*, Schlecht. & Cham. Linnaea, v. 623 (1830). *L. mandiocanum*, Raddi, Fil. Bras. 77, t. 4 (1825). — GALAPAGOS IDS.: acc. to Hemsley and Baker, ll. cc. Further distrib. trop. Am., Madagascar.

Dr. Wolf (1), 283, refers to two undetermined species of *Lycopodium* found on Charles Isl.

POTAMOGETONACEAE.

POTAMOGETON, Tourn.

P. PECTINATUS, L. Sp. 127 (1753); Schumann in Mart. Fl. Bras. iii. pt. 3, 693 (where widely interpreted). — ALBEMARLE ISL. Iguana Cove, *Snodgrass* & *Heller*, no. 941a (hb. Gr.). Of cosmopolitan distribution.

As to robustness and leaf-breadth the Galapageian specimen at hand appears to correspond most closely to the form *P. Vaillantii*, Roem. & Schultes, Syst. iii. 514 (1818), which is intermediate between the very slender typical form and the broad-leaved form which is often separated as *P. zosteraceus*, Fries, Nov. ed. 2, 51 (1828).

Ruppia, L.

R. maritima, L. Sp. 127 (1753); Reichenb. Ic. Fl. Germ. vii. t. 17, f. 26. — Albemarle Isl.: Elizabeth Bay, lava fields near the beach, *Snodgrass & Heller*, no. 938 (hb. Gr.). Widely distributed. A species not hitherto recorded on the Galapagos Ids.

NAJADACEAE.

Najas, L.

N. marina, L., var. latifolia A. Br. ex Schum. in Mart. Fl. Bras. iii. pt. 3, 725 (1894); Rendle, Trans. Linn. Soc. ser. 2, v. 396, t. 39, f. 11. *N. latifolia*, A. Br. Journ. Bot. ii. 276 (1864). — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 940a (hb. Gr.). The material at hand varies somewhat as to the arming of the internodes. In some instances they are smooth, as in var. *latifolia*; in other stems they are rather conspicuously armed. There is reason to believe that this is individual variation, and the long rather broad many-toothed leaves are those of var. *latifolia*. Further distrib. trop. S. Am.

GRAMINEAE.

Anthephora, Schreb.

A elegans, Schreb. Beschr. Gräs. ii. 105, t. 44 (1810); Kunth, Enum. i. 169; Anderss. (1), 141, & (2), 48; Rob. & Greenm. (1), 149. ? *A. cuspidata*, Anderss. ll. cc. (differences not greater than in the various continental forms, which have not yet been successfully separated). — Charles Isl.: *Andersson* (hb. Gr.); *Baur*, no. 346 (hb. Gr.), subglabrous form. Chatham Isl.: northern part, *Baur*, no. 347 (hb. Gr.), also subglabrous. Indefatigable Isl.: *Andersson* (form *A. cuspidata*). James Isl.: on James Bay, *Snodgrass & Heller*, no. 397 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am.

Aristida, L.

A. divulsa, Anderss. (1), 143, & (2), 49; Rob. & Greenm. (1), 149. — Alingdon Isl.: *Snodgrass & Heller*, no. 809 (hb. Gr.). Bindloe

Isl.: *Baur*, no. 336 (hb. Gr.). Chatham Isl.: in stony places, *Andersson* (hb. Gr.). Endemic.

A. repens, Trin. Mém. Acad. Pétersb. ser. vi. i. 87 (1831); Trin. & Rupr. ibid. vii. 128 (1842); Hook. f. (3), 175; Anderss. (1), 146, & (2), 50. — James Isl.: *Douglas*. Not secured or at least not recognized on the islands since.

A. subspicata, Trin. & Rupr. l. c. 125 (1842); Steud. Syn. 137; Hook. f. (3), 174; Anderss. (1), 143, & (2), 49; Rob. & Greenm. (1), 149. *A. caudata*, Anderss. (1), 144, & (2), 49; Rob. & Greenm. (1), 149. *A. compacta*, Anderss. (1), 145, & (2), 50. — Galapagos Ids.: *Habel*. Albemarle Isl.: *Macrae* (hb. Gr.); in dry upper region, *Andersson* (hb. Gr.); eastern portions, Cowley Bay, *Baur*, no. 340 (hb. Gr.); Elizabeth Cove, *Snodgrass & Heller*, no. 273, past flowering and doubtful (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 152 (hb. Gr.); everywhere on sandy hillsides in tufa soil, the most abundant grass above the cove, *Snodgrass & Heller*, no. 209 (hb. Gr.). Barrington Isl.: *Baur*, no. 339 (hb. Gr.); *Snodgrass & Heller*, no. 488 (hb. Gr.). Bindloe Isl.: *Snodgrass & Heller*, no. 776 (hb. Gr.). Indefatigable Isl.: *Andersson* (hb. Gr.); south of Conway Bay, *Baur*, no. 338 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 653 (hb. Gr.). James Isl.: James Bay, on sand in crevices of lava rock near beach, *Snodgrass & Heller*, no. 396 (hb. Gr.). Seymour Isl.: north, *Snodgrass & Heller*, no. 581 (hb. Gr.); south, *Snodgrass & Heller*, no. 566 (hb. Gr.). Further distrib. S. Am.

A. villosa, Rob. & Greenm. (1), 144, 149. — Duncan Isl.: *Snodgrass & Heller*, no. 699 (hb. Gr.). Jervis Isl.: *Baur*, no. 337 (hb. Gr.). Endemic.

Bouteloua, Lag.

B. pilosa, Benth. acc. to Wats. Proc. Am. Acad. xviii. 179 (1883). *Eutriana pilosa*, Hook. f. (3), 173; Anderss. (1), 147, & (2), 52 (where by Darwin is meant Macrae), t. 1, f. 3; Rob. & Greenm. (1), 149. — Abingdon Isl.: *Snodgrass & Heller*, no. 807 (hb. Gr.). Albemarle Isl.: *Macrae;* in lower rocky region, *Andersson;* southern portion, *Baur*, no. 352 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, nos. 36 (hb. Gr.), 109 (hb. Gr.), 139 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 216 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 490 (hb. Gr.). Chatham Isl.: *Andersson*. Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 655 (hb. Gr.). James Isl.: on sea bluffs of James Bay, *Snodgrass & Heller*, no. 393

(hb. Gr.). JERVIS ISL.: *Baur*, no. 351 (hb. Gr.): SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 567 (hb. Gr.); south, *Snodgrass* & *Heller*, no. 611 (hb. Gr.). Endemic.

CENCHRUS, L.

C. DISTICHOPHYLLUS, Griseb. Cat. Pl. Cub. 234 (1866); Rob. & Greenm. (1), 148. — ALBEMARLE ISL.: southern portion, *Baur*, no. 335 (hb. Gr.), wrongly recorded as from Hood Isl. by Rob. & Greenm. l. c. Sterile and hence doubtful. Further distrib. Cuba.

C. GRANULARIS, Anderss. (1), 140, & (2), 47; Rob. & Greenm. (1), 148. — ALBEMARLE ISL.: Tagus Cove, from beach to 180 m. altitude, not abundant, *Snodgrass* & *Heller*, no. 211 (hb. Gr.). CHARLES ISL.: *Baur*, no. 324 (hb. Gr.); *Snodgrass* & *Heller*, no. 456 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); *A. Agassiz* (hb. U. S. Nat. Mus.). SEYMOUR ISL.: south, *Snodgrass* & *Heller*, nos. 593, 594 (both in hb. Gr.). Endemic.

C. PLATYACANTHUS, Anderss. (1), 139, & (2), 47; Rob. & Greenm. (1), 148. — ABINGDON ISL.: *Snodgrass* & *Heller*, no. 808 (hb. Gr.). ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, nos. 37 (hb. Gr.), 112 (hb. Gr.). BARRINGTON ISL.: *Snodgrass* & *Heller*, no. 484 (hb. Gr.). BINDLOE ISL.: *Snodgrass* & *Heller*, no. 781 (hb. Gr.). CHARLES ISL.: abundant, *Andersson*; *Snodgrass* & *Heller*, no. 456a (hb. Gr.). CHATHAM ISL.: *Andersson*; *Snodgrass* & *Heller*, no. 550 (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, no. 636 (hb. Gr.). HOOD ISL.: *Baur*, no. 323 (hb. Gr.); *Snodgrass* & *Heller*, no. 716 (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass* & *Heller*, no. 678 (hb. Gr.). JAMES ISL.: James Bay, common along the coast in sand and lava soil, *Snodgrass* & *Heller*, no. 395 (hb. Gr.). NARBOROUGH ISL.: southern part, *Snodgrass* & *Heller*, no. 317 (hb. Gr.). Endemic so far as known but apparently spreading rapidly in the manner of an introduced weed.

C. sp. — CHATHAM ISL.: *Snodgrass* & *Heller*, no. 520 (hb. Gr.). A large soft-pubescent species nearly related to, if not identical with, some of the very diverse forms in the Hawaiian and other Pacific Islands now collected under *C. calyculatus*, Cav. and its supposed synonyms.

CHLORIS, SW.

C. **anisopoda**, nov. sp., annua, radice fibrosa, culmis pluribus caespitosis suberectis tenuibus teretibus glaberrimis 5–7-nodosis; vaginis striatis

margine ciliata excepta glaberrimis teretibus spicas inferiores fere in toto includentibus, foliae parte libera brevi lineari attenuata subpungente praeter basis longe ciliatae glaberrima, spicis inferioribus brevibus vaginis arcte involutis, supremis subternis erectis tenuibus flexuosis cum pedunculo gracile tereti bene exsertis, spiculis tenuibus teretibus adpressis bifloris, glumis sterilibus binis inaequalibus tenuibus lanceolati-linearibus attenuatis acutissimis uninervis translucentibus basi breviter fasciculatim barbatis, palea inferiori oblonga ciliata paullo infra apice subretusa cum arista recta tenui tenuissime barbata suae longitudini superante munita, palea superiori anguste lanceolata acutissima sed exaristata, flosculi sterilis pedicellati abortivi palea inferiori longe aristata. — *C.* sp. Rob. & Greenm. (1), 149. — CHARLES ISL.: *Baur*, no. 333 (hb. Gr.); *Snodgrass* & *Heller*, no. 459 (hb. Gr.). Endemic. Culms 2.5 to 4 dm. high; leaf blades 2 to 6 cm. long. Spikelets including the awns 6 mm. long, very slender. A species distinguished from most of its congeners by having inflorescences springing from nearly all the nodes, the lower inflorescences being almost or quite enveloped by the sheaths of the leaves.

C. ELEGANS, HBK. Nov. Gen. & Sp. i. 166, t. 49 (1815). — CHARLES ISL.: *Snodgrass* & *Heller*, no. 461 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 579 (hb. Gr.). Further distrib. southwestern U. S., Mex.

C. RADIATA, Sw. Prodr. 26 (1788); Rob. & Greenm. (1), 149. — CHARLES ISL.: *Baur*, no. 344 (hb. Gr.). Further distrib. W. Ind., S. Am.

CHUSQUEA, Kunth.

C. sp. — ALBEMARLE ISL.: on mountain east of Elizabeth Cove, alt. 923 m., *Snodgrass* & *Heller*, no. 230 (hb. Gr.), old, dead, and leafless culms only, but the genus recognizable from the peculiar mode of branching. Belonging to a group of tropical S. American grasses of the bamboo tribe, not heretofore noted upon the islands.

ELEUSINE, Gaertn.

E. AEGYPTICA, Desf. Fl. Atl. i. 85 (1798), as *aegyptia*. *E. aegyptiaca*, Rob. & Greenm. (1), 149. *Dactyloctenium aegyptiacum*, Willd. Enum. Hort. Berol. 1029 (1809); Caruel (1), 621; Rose (1), 138. — CHATHAM ISL.: *Chierchia; A. Agassiz; Snodgrass* & *Heller*, no. 551 (hb. Gr.). HOOD ISL.: *Baur*, no. 326 (hb. Gr.). Of wide distribution.

E. INDICA, Gaertn. Fruct. i. 8 (1788); Kunth, Enum. i. 272; Anderss. (1), 147, & (2), 52; Rose (1), 138; Caruel (1), 621; Rob. & Greenm. (1), 149. — CHARLES ISL.: in grassy places, middle region, *Andersson; Baur*, no. 374 (hb. Gr.); *Snodgrass & Heller*, no. 462 (hb. Gr.). CHATHAM ISL.: *Chierchia; A. Agassiz;* southwest end, middle region, *Baur*, no. 349 (hb. Gr.); *Snodgrass & Heller*, no. 552 (hb. Gr.). Of wide distribution.

ERAGROSTIS, Host.

E. BAHIENSIS, Roem. & Sch. Mant. ii. 318 (1824). — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 110 (hb. Gr.). Further distrib. S. Am.

E. CILIARIS, Link, Hort. Berol. i. 192 (1827); Rob. & Greenm. (1), 149. *Poa ciliaris*, L. Syst. ed. 10, 875 (1760); Hook. f. (3), 175; Anderss. (1), 150, & (2), 52. — ABINGDON ISL.: *Snodgrass & Heller*, no. 810 (hb. Gr.). ALBEMARLE ISL.: *Macrae;* Tagus Cove, *Snodgrass & Heller*, no. 218 (hb. Gr.). BINDLOE ISL.: *Snodgrass & Heller*, no. 777 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson; Baur*, without number (hb. Gr.); *Snodgrass & Heller*, no. 457 (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson; Baur*, no. 328 (hb. Gr.); *Snodgrass & Heller*, nos. 542 (hb. Gr.), 559 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 724 (hb. Gr.). JAMES ISL.: Orchilla Bay, *Baur*, no. 329 (hb. Gr.). NARBOROUGH ISL.: Mangrove Point, in crevices of lava near the coast, abundant, *Snodgrass & Heller*, no. 306 (hb. Gr.). TOWER ISL.: *Baur*, no. 330 (hb. Gr.); *Snodgrass & Heller*, no. 800 (hb. Gr.). Further distrib. W. Ind., S. Am.

E. MAJOR, Host. Gram. iv. 14, t. 24 (1809). *Poa megastachya*, Koehl. Desc. Gram. 181 (1802); Anderss. (1), 150, & (2), 52; Rob. & Greenm. (1), 149. — GALAPAGOS IDS.: *Habel.* BARRINGTON ISL.: *Baur*, no. 332 (hb. Gr.); *Snodgrass & Heller*, no. 489 (hb. Gr.). CHARLES ISL.: dry places on the shore, *Andersson; Snodgrass & Heller*, no. 460 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 558 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 643 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 715 (hb. Gr.). SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 590 (hb. Gr.). TOWER ISL.: *Snodgrass & Heller*, no. 798 (hb. Gr.). Of wide distribution.

E. PILOSA, Beauv. Agrost. 71 (1812). *Poa pilosa*, L. Sp. 68 (1753); Hook. f. (3), 175; Anderss. (1), 150, & (2), 52. — GALAPAGOS IDS.:

Habel. James Isl.: *Darwin*, acc. to Hook. f., l. c. Further distrib. trop. reg.

Eriochloa, HBK.

E. distachya, HBK. Nov. Gen. & Sp. i. 95, t. 30 (1815); Kunth, Enum. i. 72. *Helopus brachystachys*, Trin. Sp. Gram. iii. t. 277 (1836). — Chatham Isl.: *Snodgrass & Heller*, no. 547 (hb. Gr.). Further distrib. continental S. Am. from Panama to Brazil.

Leptochloa, Beauv.

L. albemarlensis, Rob. & Greenm. (1), 145, 149. — Albemarle Isl.: southern portion, *Baur*, no. 341 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 58 (hb. Gr.). Endemic.

L. filiformis, Roem. & Sch. Syst. ii. 580 (1817); Hook. f. Fl. Brit. Ind. vii. 298; not Beauv. — Duncan Isl.: *Snodgrass & Heller*, no. 697 (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 580 (hb. Gr.). Widely distributed in the tropics of both hemispheres.

L. Lindleyana, Kunth, Rev. Gram. ii. 655, t. 215 (1829), & Enum. i. 525; Rob. & Greenm. (1), 149. *L. hirta*, Nees acc. to Steud. Syn. i. 209 (1855). *L. Hookeri*, Anderss. (2), 51. *Trichoneuron Hookeri*, Anderss. (1), 149, & (2), 51, t. 1, f. 2. *Calamagrostis pumila*, Hook. f. (3), 176. — Albemarle Isl.: *Macrae* (hb. Gr.); in the most sterile places, *Andersson*; eastern portion, *Baur*, no. 242 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 212 (hb. Gr.). Bindloe Isl.: *Snodgrass & Heller*, no. 790 (hb. Gr.). Chatham Isl.: *Andersson*. Endemic.

L. mucronata, Kunth, Rev. Gram. i. 91 (1829). — Barrington Isl.: *Snodgrass & Heller*, no. 491 (hb. Gr.). Not previously observed on these islands. Further distrib. southern U. S., Mex.

L. virgata, Beauv. Agrost. 71 (1812); Anderss. (1), 147, & (2), 51. — Charles Isl.: upper grassy region, *Andersson* (hb. Gr.). Further distrib. Mex., W. Ind., S. Am.

Oplismenus, Beauv.

O. setarius, Roem. & Sch. Syst. ii. 481 (1817); Rob. & Greenm. (1), 148 (a species reduced by some to *O. undulatifolius*, Beauv.).— Chatham Isl.: southwest end, middle region, *Baur*, no. 322 (hb. Gr.). Further distrib. U. S., Mex., W. Ind., S. Am. The sterile and indeterminate *Oplismenus* mentioned by Caruel (1), 621, as collected on Chatham Isl. by *Chierchia* was probably of this species.

Panicum, L.

P. colonum, L. Syst. ed. 10, 870 (1760); Trin. Ic. ii. t. 160; Hook. f. (3), 172. *Oplismenus colonus*, HBK. Nov. Gen. & Sp. i. 108 (1815); Anderss. (1), 136, & (2), 45. — Charles Isl.: *Darwin;* in somewhat swampy places, middle region, *Andersson.* Further distrib. general in trop. regions.

P. fasciculatum, Sw. Prodr. 22 (1788), & Fl. Ind. Occ. i. 145; Anderss. (1), 135, & (2), 44. — Charles Isl.: *Snodgrass* & *Heller*, no. 455 (hb. Gr.). Indefatigable Isl.: *Andersson;* northern part, *Snodgrass* & *Heller*, no. 649 (hb. Gr.). James Isl.: common on sea-bluff on James Bay, *Snodgrass* & *Heller*, no. 392 (hb. Gr.). Further distrib. W. Ind., S. Am.

P. fluitans, Retz. Obs. iii. 8 (1783); Anderss. (1), 136, & (2), 45. *P. paspalodes*, Pers. Syn. i. 81 (1805). *P. paspaloides*, auct. — Chatham Isl.: in stagnant pools, middle region, *Andersson* (hb. Gr.); *Snodgrass* & *Heller*, no. 557 (hb. Gr.). Hood Isl.: on the margin of a mud lake, *Snodgrass* & *Heller*, no. 746 (hb. Gr.). Further distrib. W. Ind., S. Am., trop. of Old World.

P. fuscum, Sw. Prodr. 23 (1788); Anderss. (1), 135, & (2), 44; Caruel (1), 621; Rose (1), 138. — Charles Isl.: *Andersson; Chierchia.* Chatham Isl.: *Andersson; A. Agassiz.* Further distrib. W. Ind., S. Am. Andersson, ll. cc., distinguishes three forms or varieties: *vegetius*, *firmius*, and *pubescens.*

P. hirticaulum, J. & C. Presl, Rel. Haenk. i. 308 (1830); Kunth, Enum. i. 101; *P. hirticaulon*, Anderss. (1), 134, & (2), 43 (incl. var. *majus*, typical, and var. *glabrescens*, not very clearly marked); Rose (1), 138; Rob. & Greenm. (1), 148; a species sometimes reduced to *P. ayennense*, Lam. — Barrington Isl.: *Snodgrass* & *Heller*, no. 492 (hb. Gr.). Charles Isl.: *Andersson.* Chatham Isl.: *Andersson;* (hb. Gr.); *A. Agassiz; Snodgrass* & *Heller*, no. 548 (hb. Gr.). Gardner Isl.: *Snodgrass* & *Heller*, no. 648 (hb. Gr.). Hood Isl.: *Baur*, no. 345 (hb. Gr.); *Snodgrass* & *Heller*, no. 722 (hb. Gr.). Indefatigable Isl.: *Andersson* (hb. Gr.); northern part, *Snodgrass* & *Heller*, no. 661 (hb. Gr.). Seymour Isl.: north, *Snodgrass* & *Heller*, no. 565 (hb. Gr.); south, *Snodgrass* & *Heller*, no. 612 (hb. Gr.). It is noteworthy that this grass, now widely distributed and apparently common in the archipelago, was not noted or collected by Darwin or any of the earlier collectors upon the islands, a fact which strongly suggests recent introduction. Further distrib. Mex.

Var. MINUS, Anderss. (1), 135, & (2), 44. — CHARLES ISL.: *Andersson; Snodgrass* & *Heller*, no. 454 (hb. Gr). CHATHAM ISL.: *Andersson.* Endemic.

P. MOLLE, Sw. Prodr. 22 (1788); Caruel (1), 621. — CHATHAM ISL.: *Chierchia*, acc. to Caruel, l. c. Further distrib. W. Ind., S. Am.; also introd. in trop. Asia.

P. MULTICULMUM, Anderss. (1), 133, & (2), 43. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, no. 138 (hb. Gr.). BARRINGTON ISL.: *Snodgrass* & *Heller*, no. 487 (hb. Gr.). CHARLES ISL.: in springs of the interior, *Andersson* (hb. Gr.). DUNCAN ISL.: *Snodgrass* & *Heller*, no. 696 (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, no. 634 (hb. Gr.). Endemic.

P. SANGUINALE, L. Sp. 57 (1753). — CHATHAM ISL.: *Snodgrass* & *Heller*, no. 513 (hb. Gr.). Not secured or reported by earlier explorers, hence probably a recent introduction. Cosmopolitan weed.

P. SEROTINUM, Trin. Gram. Panic. 166 (1826). *Paspalus serotinus*, Fluegge, Gram. Monogr. 145 (1810); *Paspalum serotinum*, Kunth, Enum. i. 47; Anderss. (1), 132, & (2), 42. *Digitaria serotina*, Michx. Fl. i. 46 (1803); Hook. f. (4), 261. — CHARLES ISL.: *Edmonston* acc. to Hook. f., l. c. There can be little doubt that there was some mistake in this identification, but as it has not been possible to see the specimen the error cannot be corrected here. The species is of the southern U. S.

PASPALUM, L.

P. CANESCENS, Anderss. (1), 132, & (2), 42; Rob. & Greenm. (1), 148. *Panicum fuscum*, Rob. & Greenm. (1), 148, not Sw. — ALBEMARLE ISL.: upper part, *Andersson;* southern portion, *Baur*, no. 343 (hb. Gr.); Tagus Cove, *Snodgrass* & *Heller*, no. 198 (hb. Gr.). CHARLES ISL.: *Baur* (hb. Gr.). NARBOROUGH ISL.: southern part, *Snodgrass* & *Heller*, nos. 312 (hb. Gr.), 336 (hb. Gr.). Endemic.

P. CONJUGATUM, Berg. Act. Helv. vii. 129, t. 8 (1772); Anderss. (1), 132, & (2), 42; Rob. & Greenm. (1), 148. — CHARLES ISL.: grassy places in the more fertile parts, *Andersson.* CHATHAM ISL.: southwest end, middle region, *Baur*, no. 350 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am., trop. Africa.

P. DISTICHUM, L. Amoen. Acad. v. 391 (1760); Burm. f. Fl. Ind. 23. *P. vaginatum*, Sw. Prodr. 21 (1788); Rob. & Greenm. (1), 148. — JAMES ISL.: Orchilla Bay, in a sterile state, *Baur*, no. 334 (hb. Gr.). Further distrib. trop. and subtrop. regions.

P. LONGE-PEDUNCULATUM, Le Conte (Le Comte), Journ. Phys. xci. 284 (1820); Kunth, Enum. i. 56; Hook. f. (3), 172; Anderss. (1), 132, & (2), 42. *Panicum fuscum*, Rob. & Greenm. (1), 148, not Sw. — ALBEMARLE ISL.: *Macrae;* Iguana Cove, *Snodgrass & Heller*, no. 131 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 199 (hb. Gr.), 891 (hb. Gr.), 892 (hb. Gr.). BINDLOE ISL.: *Snodgrass & Heller*, no. 775 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson; Baur*, no. 148 (hb. Gr.). This species is by some reduced to *P. arenarium*, Schrad., which however is a later name. Further distrib. southern U. S. to Brazil.

P. PENICILLATUM, Hook. f. (3), 171; Anderss. (1), 132, & (2), 42. — CHARLES ISL.: *Darwin.* Not since collected. Endemic.

P. SCROBICULATUM, L. Mant. i. 29 (1767), as *scrobiculata;* Caruel, (1), 621. — CHATHAM ISL.: *Chierchia*, acc. to Caruel. General distrib. tropics of the Old World. It is remarkable, if Prof. Caruel was correct in his identification of this gerontogeous grass, that no trace of it has been found in the Galapagos Archipelago by any other collector.

P. sp. — INDEFATIGABLE ISL.: north, *Snodgrass & Heller*, no. 669 (hb. Gr.). Resembling *P. canescens*, Anderss., but with the leaves bearded upon both surfaces with a long and very fine villosity, and the spikelets considerably larger. Probably a new species.

PENNISETUM, Rich.

P. PAUPERUM, Nees acc. to Steud. Syn. 102 (1855). *P. exaltatum*, Hook. f. & Jacks. Ind. Kew. i. 112, 1893 (see reference under *Amphochaeta*). *Amphochaeta exaltata*, Anderss. (1), 137, & (2), 45, t. 1, f. 2. *Gymnothrix paupera*, Nees acc. to Steud. l. c. — ALBEMARLE ISL.: *Andersson* (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, nos. 16 (hb. Gr.), 141 (hb. Gr.); near Tagus Cove, altitude 150 to 1230 m., in large clumps 1 to 2 m. high, *Snodgrass & Heller*, no. 223 (hb. Gr.). Endemic, and so far as known confined to the single Island.

SETARIA, Beauv.

S. FLORIANA, Anderss. (1), 138, & (2), 46. — CHARLES ISL.: *Andersson.* Not seen by the writer. Endemic.

S. SETOSA, Beauv. Agrost. 51 (1812). *S. caudata*, R. & S. Syst. ii. 495 (1817), slender form. *S. Antillarum*, Kunth, Rev. Gram. i. 46 (1829); Anderss. (1), 138, & (2), 46; Rob. & Greenm. (1), 148. ? *S. Rottleri*, Hook. f. (3), 172; Anderss. (1), 139, & (2), 46; not Spr.

Chaetochloa setosa, Scribn. U. S. Div. Agros. Bull. iv. 39 (1897). *C. caudata*, Scribn. Rep. Mo. Bot. Gard. x. 52 (1899). *C. setosa* & *C. caudata*, Scribn. & Merrill, U. S. Div. Agros. Bull. xxi. 38, 39, f. 23, 24. *Panicum caudatum*, Lam. Ill. i. 171 (1791). *P. setosum*, Sw. Prodr. 22 (1788). — GALAPAGOS IDS.: *Douglas* (hb. Gr.). ALBEMARLE ISL.: *Macrae?* Iguana Cove, growing 4.5 to 6 dm. high and woody at base, very common under *Opuntia* thickets, *Snodgrass & Heller*, no. 35 (hb. Gr.); common everywhere from beach to 600 m. altitude, the most abundant grass, *Snodgrass & Heller*, no. 111 (hb. Gr.); north mountain, Elizabeth Cove, *Snodgrass & Heller*, no. 285 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 205 (hb. Gr.). BARRINGTON ISL.: *Snodgrass & Heller*, no. 470 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); southwest end, lower region, *Baur*, no. 321 (hb. Gr.); *Snodgrass & Heller*, no. 553 (hb. Gr.). DUNCAN ISL.: *Snodgrass & Heller*, no. 692 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 718 (hb. Gr.). JAMES ISL.: James Bay, *Snodgrass & Heller*, no. 394 (hb. Gr.). NARBOROUGH ISL.: *Snodgrass & Heller*, no. 349 (hb. Gr.). **Further distrib. trop. regions.**

S. n. sp.? Hook. f. (3), 172; Anderss. (1), 139, & (2), 47. — ALBEMARLE ISL.: *Macrae*. Not seen by the writer. **Endemic so far as known.**

SPOROBOLUS, R. Br.

S. DOMINGENSIS, Kunth, Enum. i. 214 (1833). — ABINGDON ISL.: *Snodgrass & Heller*, no. 811 (hb. Gr.). ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 140 (hb. Gr.), 862 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 717 (hb. Gr.). Further distrib. Mex., W. Ind.

S. INDICUS, R. Br. Prodr. i. 170 (1810); Kunth, Enum. i. 211: Anderss. (1), 146, & (2), 50; Caruel (1), 621; Vasey, U. S. Dept. Agric. Div. Bot. Bull. iii. 21, t. 7 (1887). *S. tenacissimus*, Beauv. Agrost. 26 (1812). — CHARLES ISL.: in upper grassy places, *Andersson* (hb. Gr.). CHATHAM ISL.: *Chierchia*. **Further distrib. U. S., Mex., S. Am., W. Ind., Old World.**

S. VIRGINICUS, Kunth, Rev. Gram. i. 67 (1829), & Enum. i. 210; Anderss. (1), 146, & (2), 51. *Agrostis virginica*, L. Sp. 63 (1753). *Distichlis* sp. Rose (1), 138. — ALBEMARLE ISL.: Elizabeth Cove, *Snodgrass & Heller*, no. 271 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 151 (hb. Gr.), 210 (hb. Gr.). CHATHAM ISL.: on banks near salt water, *Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr.); *Snodgrass*

& *Heller*, no. 549 (hb. Gr.). Further distrib. U. S., Mex., W. Ind., S. Am. Andersson notes two vegetative forms: *obesa* and *elata*.

Stenotaphrum, Trin.

S. glabrum, Trin. Fund. Agrost. 176 ("1820"). *S. americanum*, Schrank, Pl. Rar. Hort. Monac. t. 98 ("1819"); Rob. & Greenm. (1), 149. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 57 (hb. Gr.), 873 (hb. Gr.). Chatham Isl.: southwest end, middle region, *Baur*, no. 325 (hb. Gr.). Further distrib. tropical shores of both continents.

Stipa, L.

S. rostrata, Anderss. (1), 142, & (2), 48. — Chatham Isl.: *Andersson* (hb. Gr.). Habit of *Aristida subspicata*, but differing rather conspicuously in its untwisted awns. Endemic.

CYPERACEAE.

Cyperus, L.

C. aristatus, Rottb. Descr. Nov. Pl. 23, t. 6, f. 1 (1786); C. B. Clarke, Jour. Linn. Soc. xxi. 91. *C. inflexus*, Muhl. Descr. Gram. 16 (1817); Hook. f. (3), 177; Anderss. (1), 153, & (2), 54. — Albemarle Isl.: *Macrae* (var. γ *elongatus*, Hook. f., l. c. 178); Tagus Cove, *Snodgrass & Heller*, no. 173 (hb. Gr.). Charles Isl.: *Darwin* (var. β *acaulis*, Hook. f., l. c.). Chatham Isl.: *A. Agassiz* (hb. U. S. Nat. Mus.). James Isl.: *Scouler*. Narborough Isl.: south, 615 m. altitude, *Snodgrass & Heller*, no. 345 (hb. Gr.). Further distrib. N. Am., Mex., W. Ind., S. Am., Old World.

C. brachystachys, Anderss. (2), 53, t. 13, f. 2; Rob. & Greenm. (1), 148, where by typographical error ascribed to Charles Island. *Mariscus brachystachys*, Hook. f. (3), 179; Anderss. (1), 152. — Abingdon Isl.: *Snodgrass & Heller*, no. 832 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 39 (hb. Gr.); southern portion, *Baur*, no. 313 (hb. Gr.). Charles Isl.: *Darwin; Andersson*. Chatham Isl.: southwest end, middle region, *Baur*, no. 312 (hb. Gr.). James Isl.: *Scouler*. Tower Isl.: *Snodgrass & Heller*, no. 791 (hb. Gr.). Endemic. This species is known to me only from the descriptions of Hooker and Andersson, which do not altogether agree, and from Andersson's figure, which is not very satisfactory. The specimens of recent collections mentioned above are referred here with doubt.

Snodgrass & Heller's no. 132 (hb. Gr.) from Iguana Cove, Albemarle Isl., with irregular unequal rayed umbels and remarkably slender spikes, has closely similar floral structure and is probably an extreme form of this species.

C. CONFERTUS, Sw. Prodr. 20 (1788), & Fl. Ind. Occ. i. 115; Anderss. (2), 54; Rose (1), 138. *C. biuncialis*, Anderss. (1), 156, & (2), 56. *C. dissitiflorus*, Anderss. (1), 153, & (2), 54. — ALBEMARLE ISL.: *Andersson* (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 907 (hb. Gr.). BINDLOE ISL.: *Snodgrass & Heller*, no. 784 (hb. Gr.). CHARLES ISL.: *Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr.); *Snodgrass & Heller*, nos. 403 (hb. Gr.), 458 (hb. Gr.). CHATHAM ISL.: *Andersson; A. Agassiz; Snodgrass & Heller*, no. 500 (hb. Gr.). DUNCAN ISL.: *Snodgrass & Heller*, no. 684 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 742 (hb. Gr.) INDEFATIGABLE ISL.: *Andersson*. JAMES ISL.: *Andersson*. Further distrib. trop. Am.

C. ESCULENTUS, L. Sp. 45 (1753); Kunth, Enum. ii. 61; Anderss. (1), 153, & (2), 54. *C. strigosus*, Anderss. ll. cc., at least in part? not L. — ALBEMARLE ISL.: Tagus Cove, in damp soil of cañons, *Snodgrass & Heller*, no. 179 (hb. Gr.). CHATHAM ISL.: in grassy places, *Andersson* (hb. Gr.). Further distrib. general.

C. FUGAX, Liebm. Mex. Halv. 8 (1850), & Vidensk Selsk. Skr. ser. 5, ii. 196 (1851); Rob. & Greenm. (1), 148. — CHATHAM ISL.: southwest end, middle region, *Baur*, no. 311 (hb. Gr.). Further distrib. Mex. A species referred by Hook. f. & Jacks. Ind. Kew. i. 693 to *Pycreus polystachyus*.

C. GALAPAGENSIS, Caruel (1), 621. — CHATHAM ISL.: *Chierchia*. Endemic.

C. GRANDIFOLIUS, Anderss. (1), 157, & (2), 56. — CHATHAM ISL.: in ditches filled with water in the interior part of the island, *Andersson*. Endemic.

C. LAEVIGATUS, L. Mant. ii. 179 (1771). — ALBEMARLE ISL.: Elizabeth Cove, *Snodgrass & Heller*, no. 260 (hb. Gr.). Further distrib. cosmop. trop.

C. LIGULARIS, L. Amoen. Acad. v. 391 (1760). *Mariscus rufus*, HBK. Nov. Gen. & Sp. i. 216, t. 67 (1815). — ALBEMARLE ISL.: Elizabeth Cove, *Snodgrass & Heller*, nos. 263 (hb. Gr.), 264 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 861 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 191 (hb. Gr.). Further distrib. W. Ind., trop. S. Am., trop. Africa.

C. Mutisii, Anderss. (2), 53, in two forms; Rob. & Greenm. (1), 148 (var. *plenus*). *Mariscus Mutisii*, HBK. Nov. Gen. & Sp. i. 216, t. 66 (1815); Kunth, Enum. ii. 124; Hook. f. (1), 178; Anderss. (1), 151. — Albemarle Isl.: *Macrae;* Elizabeth Cove, *Snodgrass & Heller*, no. 262 immature and doubtful (hb. Gr.); Tagus Cove, abundant wherever a little soil occurs in cañons, lava fields, or on hillsides, *Snodgrass & Heller*, nos. 894 (hb. Gr.), 190 also immature and doubtful (hb. Gr.). Charles Isl.: *Andersson* (hb. Gr.). Chatham Isl.: dry places, middle region, *Andersson; Baur*. Gardner Isl.: *Snodgrass & Heller*, no. 647 (hb. Gr.). Narborough Isl.: Mangrove Point, lava rock near beach and also inland, *Snodgrass & Heller*, nos. 310 (hb. Gr.), 311 (hb. Gr.); southern part, 615 m. altitude, abundant in heavy soil, *Snodgrass & Heller*, no. 334, a slender and doubtful form (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 602 (hb. Gr.).

C. rotundus, Hook. f. (3), 177; Anderss. (1), 153, & (2), 54; not L.? — Albemarle Isl.: *Macrae*, ex Hook. f., l. c. According to Hook. f. & Jacks. Ind. Kew. i. 698, the plant of Macrae was the Texan *C. lutescens*, Torr. & Hook., but acc. to Dr. N. L. Britton, who has examined the type of the latter, the Texan plant was only a form or variety of *C. esculentus*, L.

C. rubiginosus, Hook. f. (3), 178; Anderss. (1), 157, & (2), 56; Rob. & Greenm. (1), 148, as to pl. from Duncan Isl. — Spiculis oblongis, 6–10 mm. longis; squamulis 10–19. — Galapagos Ids.: *Goodridge*, in part (hb. Gr.). Charles Isl.: *Darwin*. Chatham Isl.: *Snodgrass & Heller*, no. 501 (hb. Gr.). Duncan Isl.: *Baur*, no. 318 (hb. Gr.). Endemic.

Var. **cornutus**, spiculis perbrevibus valde congestis; squamulis 4–8. — *Mariscus cornutus*, Anderss. (1), 151. *Cyperus cornutus*, Anderss. (2), 53, t. 13, f. 1. *C. rubiginosus*, Rob. & Greenm. (1), 148, as to pl. from Chatham and Hood Ids. — Galapagos Ids.: *Goodridge*, in part (hb. Gr.). Charles Isl.: *Andersson* (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); southwest end, middle region, *Baur*, no. 315 (hb. Gr.). Duncan Isl.: *Snodgrass & Heller*, no. 683 (hb. Gr.). Hood Isl.: *Baur*, no. 314 (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 595 (hb. Gr.). Endemic.

C. strigosus, L. Sp. 47 (1753); Hook. f. (3), 177; Anderss. (1), 153, & (2), 54? — Charles Isl.: *Darwin*. Chatham Isl.: *Andersson*. Further distrib. N. Am. I have seen no Galapageian specimens

of this species, and am inclined to believe that the plants so referred by Hooker and Andersson will prove to be forms rather of *C. esculentus*.

C. SURANIMENSIS, Rottb. Descr. Nov. Pl. 35, t. 6, f. 5 (1786); Kunth, Enum. ii. 43; Hook. f. (3), 177; Anderss. (1), 153, & (2), 54. —JAMES ISL.: *Darwin*, acc. to Hook. f., l. c. Further distrib. trop. S. Am., Mex., W. Ind., S. United States.

C. TRISTACHYUS, Boeck. Linnaea, XXXV. 454 (1867–1868); Rob. & Greenm. (1), 148. — CHATHAM ISL.: southwest end, middle region, *Baur*, no. 316 (hb. Gr.). Further distrib. Venezuela, Colombia, southern central Mexico.

C. sp. — NARBOROUGH ISL.: southern part, altitude 615 m., *Snodgrass & Heller*, no. 337 (hb. Gr.).

C. sp. WENMAN ISL.: dried stalks of a *Cyperus* are mentioned in Mr. Heller's field notes, as observed on a small islet near Wenman.

DICHRONEMA, Michx.

D. LEUCOCEPHALA, Michx. Fl. i. 37 (1803); Rob. & Greenm. (1), 148. — CHATHAM ISL.: southwest end, middle region, *Baur*, no. 353 (hb. Gr.). Further distrib., S. United States, Mex., W. Ind.

ELEOCHARIS, R. Br.

E. FISTULOSA, Schult. Mant. ii. 89 (1824); Caruel (1), 622. — CHATHAM ISL.: *Chierchia*, acc. to Caruel. Further distrib. trop. of the Old World. I cannot help a strong suspicion that this when reëxamined will prove to be the following species.

E. MUTATA, R. Br. Prodr. 224 (1810). *Scirpus mutatus*, L. Syst. Nat. ed. 10, 867 (1760). — ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass & Heller*, no. 261 (hb. Gr.). Further distrib. S. Am., W. Ind.

FIMBRISTYLIS, Vahl.

F. CAPILLARIS, Gray, Man. Bot. ed. 5, 567 (1869). *Scirpus capillaris*, L. Sp. 49 (1753). — BINDLOE ISL.: *Snodgrass & Heller*, no. 790 a (hb. Gr.). NARBOROUGH ISL.: Mangrove Point, near beach in crevices of lava, abundant, *Snodgrass & Heller*, no. 304 (hb. Gr.). Further distrib. N. Am., Mex., W. Ind., southward to Uruguay.

F. DIPHYLLA, Vahl, Enum. ii. 289 (1805). — HOOD ISL.: *Snodgrass & Heller*, no. 730 (hb. Gr.). Widely distrib. in trop. regions.

Hemicarpha, Nees.

H. subsquarrosa, Nees in Mart. Fl. Bras. ii. pt. 1, 61 (1842); Rob. & Greenm. (1), 148. *H. micrantha*, Britton, Bull. Torr. Club, xv. 104 (1888); Coville, ibid. xxi. 34. *Scirpus micranthus*, Vahl, Enum. ii. 254 (1805). — Chatham Isl.: southwest end, middle region, *Baur*, no. 317 (hb. Gr.). Further distrib. U. S., Mex., W. Ind., S. Am.

Kyllinga, Rottb.

K. pumila, Michx. Fl. i. 28 (1803), as *Kyllingia*. *K. caespitosa*, Nees in Mart. Fl. Bras. ii. pt. 1, 12 (excl. syn. Kunth); Rob. & Greenm. (1), 148, as *Kyllingia*. — Charles Isl.: *Baur*, no. 319 (hb. Gr.). Further distrib. U. S., W. Ind., Mex., S. Am.

Scleria, Berg.

S. pratensis, Lindl. ex Nees, Nov. Act. Nat. Cur. xix. Suppl. i. 121 (1843); Rob. & Greenm. (1), 148. — Chatham Isl.: southwest end, upper region, *Baur*, no. 320 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am.

LEMNACEAE.

Lemna, L.

L. sp., Wolf (1), 284. — Charles Isl.: in brook near hacienda, acc. to Wolf, l. c.

BROMELIACEAE.

Tillandsia, L.

T. insularis, Mez in DC. Monogr. ix. 756 (1896). *T.* sp. Rob. & Greenm. (1), 148. — Galapagos Ids.: *Steindachner*, no. 28 (in hb. Naturh. Mus. Vienna). Duncan Isl.: *Baur*, no. 237 (hb. Gr.). Endemic. A *Tillandsia* sp. coll. on the Galapagos Ids. by Habel, may prove the same.

COMMELINACEAE.

Commelina, Plum.

C. nudiflora, L. Sp. 41 (1753). *C. agraria*, Kunth, Enum. iv. 38 (1843); Hook. f. (3), 179; Anderss. (1), 158, & (2), 56; Rob. & Greenm. (1), 148. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 56 (hb. Gr.), 103 (hb. Gr.). Charles Isl.: *Darwin*. Duncan Isl.: *Baur*, no. 238 (hb. Gr.). James Isl.: *Darwin*. Further distrib. general in the tropics.

COMMELINACEA? Caruel (1), 621. — CHARLES ISL.: *Chierchia.* Same as the preceding?

AMARYLLIDACEAE.

HYPOXIS, L.

H. DECUMBENS, L. Amoen. Acad. v. 396 (1759), & Syst. Nat. ed. 10, 986; Baker, Jour. Linn. Soc. xvii. 107. *H. erecta*, Hook. f. (3), 180; Anderss. (1), 158, & (2), 57; Rob. & Greenm. (1), 148, not L. — CHARLES ISL.: *Darwin.* CHATHAM ISL.: southwest end, upper region, *Baur*, no. 239 (hb. Gr.). Further distrib. Mex., W. Ind., trop. of S. Am.

ORCHIDACEAE.

EPIDENDRUM, L.

E. SPICATUM, Hook. f. (3), 180; Anderss. (1), 158, & (2), 57. — CHARLES ISL.: *Lee* (hb. U. S. Nat. Mus.), fruiting specimen, the identity not quite certain. JAMES ISL.: *Darwin.* Endemic.

PIPERACEAE.

PEPEROMIA, R. & P.

P. FLAGELLIFORMIS, Hook. f. ex. Miq. in Hook. Lond. Jour. Bot. iv. 423 (1845), & (3), 181; Anderss. (1), 158, & (2), 57. — JAMES ISL.: *Darwin.* Endemic.

P. GALAPAGENSIS, Hook. f. ex. Miq. in Hook. Lond. Jour. Bot. iv. 426 (1845), & (3), 180; Anderss. (1), 158, & (2), 57. — JAMES ISL.: *Darwin.* Endemic.

P. GALIOIDES, HBK. Nov. Gen. & Sp. i. 71, t. 17 (1815). — ABINGDON ISL.: alt. 510 m., *Snodgrass & Heller*, no. 837 (hb. Gr.). Determined by Mr. Casimir de Candolle. Further distrib. Mex., trop. S. Am.

P. PETIOLATA, Hook. f. (3), 181; Anderss. (1), 158, & (2), 57. — JAMES ISL.: *Darwin.* Endemic.

P. RAMULOSA, Anderss. (1), 158, & (2), 57. — CHARLES ISL.: on tree trunks at the summit of the mountain, *Andersson.* Endemic.

P. **Snodgrassii**, C. DC. nov. sp., " foliis ternis-quaternis brevissime petiolatis a basi acuta ellipticis apice obtusis vel oblongo-obovatis utrinque dense pilosulis, amentis apice ramulorum verticillatis pedunculatis ipsis folia fere aequantibus, bractea orbiculari centro subsessili, ovario emerso ovato paullo sub apice stigmatifero, stigmate minuto et

glabro. — Herbula ramulis ad 3 cm. longis et circa 1 mm. crassis, dense pilosulis. Foliorum limbi in sicco membranacei ad 7 mm. longi et ad 3½ mm. lati. Amenta confertiflora in sicco rufescentia pedunculis 3 mm. longis, rhachis glabra. Ovarium sessile." — ALBEMARLE ISL.: Iguana Cove, on trees and bushes, *Snodgrass & Heller*, no. 130 (hb. Gr. and hb. C. DC.). Endemic.

P. nov. sp. — ALBEMARLE ISL.: mountain east of Tagus Cove, alt. 925 m., *Snodgrass & Heller*, no. 232 (hb. Gr.). Determined by Mr. Casimir de Candolle. Endemic.

P. sp. Rob. & Greenm. (1), 148. — CHATHAM ISL.: *Baur*. (Specimen not in hb. Gr. but sent as unicate to hb. Clark Univ.).

URTICACEAE.

FLEURYA, Gaud.

F. AESTUANS, Gaud. in Freyc. Voy. Bot. 497 (1826): Anderss. (2), 58. *F. aestuans*, var. *tuberculata* (poorly marked), Wedd. in DC. Prodr. xvi. pt. 1, 72 (1869); Rob. & Greenm. (1), 148. *F. cordata*, Gaud. l. c. 498, & Bot. Bonite, t. 83; Wedd. Arch. Mus. ix. 110; Anderss. (2), 57. ? *Urtica canadensis*, Hook. f. (3), 182; Anderss. (1), 160; not L. *U. divaricata*, Hook. f. (3), 181; Anderss. (1), 159; not L. *U. latifolia*, & *tuberculata*, Anderss. (1), 159, & (2), 57, 58. *U. racemosa*, Anderss. (2), 57. ? *Laportea canadensis*, Anderss. (2), 58, not Gaud. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 55 (hb. Gr.), 100 (hb. Gr.); southern portion, *Baur*, no. 240 (hb. Gr.); Tagus Cove, tolerably common in shady places from the beach to 300 m. alt., *Snodgrass & Heller*, no. 186 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson* (hb. Gr.). CHATHAM ISL.: *Snodgrass & Heller*, no. 525 (hb. Gr.). JAMES ISL.: *Darwin*, acc. to Anderss. l. c. under *Laportea canadensis*, but not mentioned by Hooker f.; James Bay, abundant in lava soil under bushes, *Snodgrass & Heller*, no. 375 (hb. Gr.). NARBOROUGH ISL.: southern portion, *Snodgrass & Heller*, no. 339 (hb. Gr.). Further distrib. trop. S. Am.

PARIETARIA, L.

P. DEBILIS, G. Forst. Fl. Ins. Aust. Prodr. 73 (1786). *P. floridana*, Hook. f. (3), 182 (see Wedd. Arch. Mus. ix. 516); Anderss. (1), 160, & (2), 58. — CHARLES ISL.: *Darwin*. JAMES ISL.: *Darwin*. Further distrib. trop. Am., Asia, Pacific Ids.

Pilea, Lindl.

P. Baurii, nov. sp., annua erecta debilis; caule glaberrimo rufo-brunneo parce ramoso; foliis oppositis graciliter petiolatis ovatis 3-nervis acutis basi obtusis vel rotundatis obtuse serratis tenuibus supra viridibus obscure adpresso-pubescentibus nervis leviter impressis subtus paullo pallidioribus pubescentibus nervis plus minusve prominentibus; stipulis late ovatis apice rotundatis strigosis; cymis masculis oppositis axillaribus compositis quam petiolum multo brevioribus leviter recurvatis, foeminis ignotis. — *P.* sp. Rob. & Greenm. (1), 148. — Charles Isl.: June, 1891, *Baur*, no. 241 (hb. Gr.). Chatham Isl.: southwest end, middle region, June, 1891, *Baur*, no. 242 (hb. Gr.). Endemic. Leaves 1.7 to 4 cm. long, three-fourths as broad; petioles 1.3 to 1.8 cm. long; staminate cymes 8 to 11 mm. long. A species with the habit and foliage much as in *P. pubescens*, Poir., but the inflorescence of *P. peploides*, HBK. Plate 2, fig. 1.

P. muscosa, Lindl. Coll. Bot. t. 4; Wedd. Arch. Mus. ix. 174. *P. succulenta*, Hook. f. (3), 182; Anderss. (1), 160, & (2), 58; not Wedd. (see Hook. f. & Jacks. Ind. Kew. i. 524). *Parietaria microphylla*, L. Syst. Nat. ed. 10, 1308 (1760). — James Isl.: *Darwin*, acc. to Hook. f., l. c. Further distrib. trop. S. Am., Mex., W. Ind.

P. peploides, Hook. & Arn. Bot. Beech. 96 (1832); Hook. f. (3), 182; Wedd. Arch. Mus. ix. 179; Anderss. (1), 160, & (2), 58. *Dubreulia peploides*, Gaud. in Freyc. Voy. Bot. 495 (1826). — James Isl.: *Darwin*. Further distrib. Pacific Ids., Asia.

LORANTHACEAE.

Phoradendron, Nutt.

P. florianum. *Viscum florianum*, Anderss. (1), 219, & (2), 92. — Charles Isl.: in middle region, *Andersson*. Endemic.

P. galapageium. *Viscum galapageium*, Hook. f. (3), 216; *V. galapagejum*, Anderss. (1), 220, & (2), 92. — Galapagos Ids.: *Habel*. Chatham Isl.: *Darwin; Andersson*. Endemic.

P. Henslovii. *Viscum Henslorii*, Hook. f. (3), 216; Anderss. (1), 219, & (2), 92; Rob. & Greenm. (1), 148. — Abingdon Isl.: *Snodgrass & Heller*, no. 825 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 40 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, no. 228 (hb. Gr.). Charles Isl.: *Darwin*.

Chatham Isl.: southwest end, upper region, *Baur*, no. 286 (hb. Gr.). Endemic.

P. **uncinatum**, nov. sp., glabrum lignoso-carnosum; caulibus teretibus olivaceo-viridibus dichotomo ramosis; ramis arcuatis etiam teretibus gracilibus; internodiis elongatis; foliis oppositis breviter petiolatis lanceolatis vel ovati-lanceolatis integris 5-nervatis margine ad apicem falcato-uncinatam revoluta basi cuneata; spicis in dichotomis terminalibus elongatis saepius 7-nodosis; floribus 4-seriatim immersis; calycis segmentis late deltoideis obtusis. — Narborough Isl.: southern part, common on "palo santo" and coffee trees, at 300 to 600 m. alt., April, 1899, *Snodgrass* & *Heller*, no. 325 (hb. Gr.). Endemic. Leaves 7 cm. long, 1.6 to 2.3 cm. broad. Spikes 7 cm. long, segments 1.5 cm. long; sheath short, sharply 2-pointed. Plate 1, fig. 1.

POLYGONACEAE.

Polygonum, L.

P. acuminatum, HBK. Nov. Gen. & Spec. ii. 178 (1817); Meisn. in Mart. Fl. Bras. v. pt. 1, 14, t. 4, & in DC. Prodr. xiv. 114; Griseb. Fl. Brit. W. Ind. 161; Small, Monog. Gen. Polyg. 52, t. 13.— Galapagos Ids.: acc. to Griseb. l. c. Further distrib. trop. S. Am., Centr. Am., W. Ind.

P. galapagense, Caruel (1), 624. — Chatham Isl.: *Chierchia* (hb. Kew.). Endemic.

CHENOPODIACEAE.

Atriplex, L.

A. sp. — Indefatigable Isl.: northern part, *Snodgrass* & *Heller*, no. 676 (hb. Gr.). Seymour Isl.: north, *Snodgrass* & *Heller*, no. 571 (hb. Gr.).

A. sp. — Wenman Isl.: *Snodgrass* & *Heller*, no. 9 (hb. Gr.).

AMARANTACEAE.

Alternanthera, Forsk.

A. radicata, Hook. f. (4), 261, 262; Anderss. (1), 164, & (2), 60, t. 3, f. 2. — *A. acaulis*, Anderss. (1), 164. — Chatham Isl.: *Darwin;* in upper very dry region, *Andersson* (hb. Gr.). Hood Isl.: *Snodgrass* & *Heller*, no. 753 (hb. Gr.). Endemic.

A. RIGIDA, Rob. & Greenm. (1), 143, 148. — JAMES ISL.: Orchilla Bay, *Baur*, no. 387 (hb. Gr.). Endemic.

A. SUBSCAPOSA, Hook. f. (3), 189; Moq.-Tand. in DC. Prodr. xiii. pt. 2, 353; Anderss. (1), 164 & (2), 60. — CHARLES ISL.: *Darwin*. Endemic.

AMARANTHUS, L.

A. CARACASANUS, HBK. Nov. Gen. & Sp. ii. 195 (1817); Hook. f. (3), 189; Anderss. (1), 161, & (2), 58; Rob. & Greenm. (1), 147. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 77 (hb. Gr.); on beach, not common, *Snodgrass & Heller*, no. 108 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 219 (hb. Gr.); southern portion, *Baur*, no. 287 (hb. Gr.). CHARLES ISL.: *Darwin;* in cultivated ground, *Andersson; Snodgrass & Heller*, no. 421 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.), but not recorded in his works; *Snodgrass & Heller*, no. 516 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson*. Further distrib. S. Am.

A. CELOSIOIDES, HBK. Nov. Gen. & Sp. ii. 194 (1817); Moq.-Tand. in DC. Prodr. xiii. pt. 2, 257; Hook. f. (3), 189; Anderss. (1), 161, & (2), 59. — CHARLES ISL.: *Darwin; Andersson*. CHATHAM ISL.: *Andersson*. — Further distrib. northern S. Am. A very doubtful species in need of further study. I have seen none of the specimens upon which the records of its occurrence in the Galapagos Islands rests.

A. SCLERANTOIDES, Anderss. (2), 59, t. 2, f. 1; Rob. & Greenm. (1), 139, 147. *Euxolus sclerantoides*, Anderss. (1), 163. — GALAPAGOS IDS.: *Habel*. BARRINGTON ISL.: *Snodgrass & Heller*, no. 469 (hb. Gr.). CHARLES ISL.: in lower dry region, *Andersson*. NARBOROUGH ISL.: eastern part, *Snodgrass & Heller*, no. 354 (hb. Gr.). Endemic.

Forma CHATHAMENSIS, Rob. & Greenm. (1), 140. — CHATHAM ISL.: southwest end, lower region, *Baur*, no. 289 (hb. Gr.). Endemic.

Forma HOODENSIS, Rob. & Greenm. l. c. — GARDNER ISL.: *Snodgrass & Heller*, no. 635 (hb. Gr.). HOOD ISL.: *Baur*, no. 288 (hb. Gr.), *Snodgrass & Heller*, no. 731 (hb. Gr.). Endemic.

A. SPINOSUS, L. Sp. 991 (1753); Anderss. (1), 161, & (2), 59. — CHARLES ISL.: cultivated ground of lower region, *Andersson*. Doubtless an introduction, not seen since on the islands. Further distrib. general in warm and temperate countries.

A. SQUARRULOSUS, Uline & Bray, Bot. Gaz. xix. 270 (1894); Rob. & Greenm. (1), 147. *Amblogyne squarrulosa*, Gray, Proc. Am. Acad. v. 169 (1861). *Scleropus squarrulosus*, Anderss. ined. ex Gray, l. c.,

and Uline & Bray, l. c. *S. squamulatus*, Anderss. (1), 162, & (2), 60. — Albemarle Isl.: quite common near beach, Tagus Cove, *Snodgrass & Heller*, no. 183 (hb. Gr.). Charles Isl.: *Snodgrass & Heller*, no. 422 (hb. Gr.). Chatham Isl.: in grassy places at low altitude, *Andersson* (hb. Gr.). Duncan Isl.: *Snodgrass & Heller*, no. 691 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 663 (hb. Gr.). Jervis Isl.: *Baur*, no. 390 (hb. Gr.). Seymour Isl.: north, *Snodgrass & Heller*, no. 570 (hb. Gr.). Endemic. Unfortunately Dr. Gray misread Andersson's label and altered the specific name.

A. urceolatus, Benth. Bot. Sulph. 158 (1844); Uline & Bray, Bot. Gaz. xix. 269. *Sarratia urceolata*, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 269 (1849). *Scleropus urceolatus*, Anderss. (1), 162. *Amblogyna urceolata*, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 270; Anderss. (2), 59, t. 2, f. 2; Gray, Proc. Am. Acad. v. 168 (1861), as *Ambloggne*. — Indefatigable Isl.: grassy places at low altitude, *Andersson*. Further distrib. adj. S. Am., from Peru northward. Lower Calif.

A. viridis, L. Sp. ed. 2, 1405 (1763); Uline & Bray, Bot. Gaz. xix. 319. — Barrington Isl.: *Snodgrass & Heller*, 481 (hb. Gr.). Chatham Isl.: *Snodgrass & Heller*, no. 529 (hb. Gr.). Probably of recent introduction. Further distrib. general in warm countries.

Froelichia, Moench.

F. juncea, Rob. & Greenm. (1), 143, 148. — Albemarle Isl.: mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 290 (hb. Gr.); southern portion, *Baur*, no. 388 (hb. Gr.); mountain east of Tagus Cove, alt. 925 m., *Snodgrass & Heller*, no. 243 (hb. Gr.). Endemic.

F. lanigera, Anderss. (2), 63. *F. lanata*, Anderss. (2), t. 3, f. 1. — Albemarle Isl.: *Andersson*; Tagus Cove, *Snodgrass & Heller*, no. 895 (hb. Gr.). Endemic.

F. nudicaulis, Hook. f. (3), 192; Moq.-Tand. in DC. Prodr. xiii. pt. 2, 423; Anderss. (1), 170, & (2), 63, t. 4, f. 3. — Charles Isl.: *Darwin; Andersson* (hb. Gr.). Chatham Isl.: *Andersson*. Endemic.

F. **scoparia**, nov. sp. *F. lanigerae* valde affinis; caulibus decumbentibus basi plus minusve lignosis ramosissimis subteretibus glabratis cortice lutescente tectis; ramis ramulisque erectis teretibus gracilibus sparse adpresso-lanatis, internodiis elongatis quam folii lineares acuti patentes sparse adpresso-lanati multo longioribus; pedunculis terminalibus nudis elongatis; capitulis terminalibus paucifloris subglobosis verticillastro

uno paullo inferiori vel evoluto vel nullo; bracteis ovatis glabriusculis brevibus obtusis; perigonio ovoideo-conico; laciniis ovatis obtusis stramineis basi lanatis supra glabratis induratis. — NARBOROUGH ISL.: southern part, abundant at 600 m. alt., *Snodgrass & Heller*, March, 1899, no. 346 (hb. Gr.), and April, 1899, no. 322 (hb. Gr.). This species may prove a variety of *F. lanigera*, Anderss., with which it shares many characteristics. It is, however, taller, considerably more slender and less lanate. The leaves are longer, narrower, and more acute, and the heads smaller and in general fewer-flowered.

IRESINE, L.

I. EDMONSTONEI, Hook. f. (3), 190; Moq.-Tand. in DC. Prodr. xiii. pt. 2, 343; Anderss. (1), 164, & (2), 60. — CHARLES ISL.: *Darwin*. Endemic? A plant in herb. Gray, labelled "*Iresine Edmonstonei*, Hook. f. Guayaquil? Mr. Edmonston," answers well to the description of this species.

PLEUROPETALUM, Hook. f.

P. DARWINII, Hook. f. (1), t. 2, (3), 221, & Bot. Mag. cix. under t. 6674, where second species is figured and genus is referred as by Endlicher and by Moquin to *Amarantaceae;* Anderss. (1), 225, & (2), 96. *Allochlamys Darwinii*, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 463. — ALBEMARLE ISL.: Iguana Cove near beach, *Snodgrass & Heller*, no. 646 (hb. Gr.). JAMES ISL.: *Darwin*. Endemic. The single specimen of this problematic plant secured by Messrs. Snodgrass & Heller is rather fragmentary but corresponds closely with the characterization and figure (Journ. of Bot.) published by Hooker. In its dense (although fruiting) inflorescence, relatively small leaves, 4 to 5 carpels and 6 to 8 stamens, it would seem sufficiently distinct from *P. costaricense* [H. Wendl.] Hemsl. Biol. Cent.-Am. Bot. iii. 12, figured by Hook. f. Bot. Mag. 6674. The congeneric *Melanocarpum Sprucei*, Hook. f. Gen. Pl. iii. 24 of Ecuador is said to have 2 to 3 carpels and 5 stamens.

TELANTHERA, R. Br.

T. ECHINOCEPHALA, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 373 (1849); Anderss. (1), 167, & (2), 62; Rose (1), 137; Rob. & Greenm. (1), 148. *T. argentea*, Anderss. (1), 168. *T.* sp. Rose (1), 137. *Brandesia echinocephala*, Hook. f. (3), 189. — GALAPAGOS IDS.: *Habel*. ABINGDON ISL.: *Baur*, no. 299 (hb. Gr.); *Snodgrass & Heller*, no. 850 (hb. Gr.). ALBEMARLE ISL.: southern portion, *Baur*,

no. 300 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 31 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 467 (hb. Gr.). Charles Isl.: *Darwin; Andersson; A. Agassiz; Snodgrass & Heller*, no. 414 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); *A. Agassiz* (hb. U. S. Nat. Mus.); southwest end, lower region, *Baur*, no. 301 (hb. Gr.); *Snodgrass & Heller*, no. 497 (hb. Gr.). Duncan Isl.: *A. Agassiz* (hb. Gr. & hb. U. S. Nat. Mus.); *Baur*, no. 298 (hb. Gr.); *Snodgrass & Heller*, no. 711 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 624 (hb. Gr.). Hood Isl.: *Baur*, no. 297 (hb. Gr.). Indefatigable Isl.: *Andersson;* northern part, *Snodgrass & Heller*, no. 680 (hb. Gr.). James Isl.: *Andersson;* James Bay, *Baur*, no. 296 (hb. Gr.); abundant, shrubby, spreading, 1 to 1.3 m. high, *Snodgrass & Heller*, no. 360 (hb. Gr.). Endemic. With the far more copious material now at hand I have been unable to follow the formal subdivision of this species suggested by Andersson or to correlate the trifling variations with occurrence upon the different islands.

T. filifolia, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 368 (1849); Anderss. (1), 165, & (2), 61. *Bucholtzia filifolia*, Hook. f. (3), 192. — James Isl.: *Scouler.* Endemic.

T. flavicoma, Anderss. (1), 166, & (2), 61, t. 5, f. 2; Rob. & Greenm. (1), 148, in part (as to pl. Hood Isl.). — Abingdon Isl.: *Snodgrass & Heller*, no. 826 (hb. Gr.), identity doubtful. Charles Isl.: in dry grassy places at middle altitudes, *Andersson.* Gardner Isl.: *Snodgrass & Heller*, no. 617 (hb. Gr.). Hood Isl.: *Baur*, no. 291 (hb. Gr.); *Snodgrass & Heller*, no. 733 (hb. Gr.). Endemic.

T. frutescens, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 265 (1849) q. v. for synon.; Caruel (1), 625. *Illicebrum frutescens*, L'Her. Stirp. Nov. iv. 75, t. 37 (1785). *Alternanthera frutescens*, R. Br. acc. to Spreng. Syst. i. 819 (1825), not Rob. & Greenm. (1), 148. — Chatham Isl.: *Chierchia*, acc. to Caruel, l. c. Further distrib. W. S. Am., Panama to Caracas and Chili.

T. glaucescens, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 369 (1849); Anderss. (1), 167, & (2), 62, t. 5, f. 3. *Bucholtzia glaucescens*, Hook. f. (3), 191. — Charles Isl.: in the middle region, *Andersson.* Chatham Isl.: *Darwin;* in grassy places and dry parts of the lower region, *Andersson* (hb. Gr.). Endemic.

T. Helleri, nov. sp., stellato-tomentella grisea novellis subochraceis; ramis dichotomis teretibus gracilibus; internodiis quam folii multo longioribus; foliis late ovalibus vel orbicularibus apice rotundatis vel obtusis vel

in superioribus acutis, basi subtruncato, lamina 2–2.6 cm. longa 2.4–3 cm. lata penninervia, subtus haud vel paullo pallidiore ; petiolo 3–4 mm. longo recurvato : capitulis in dichotomis sessilibus ovoideis 4–6 mm. longis 4 mm. crassis apice rotundatis ochraceo-pubescentibus ; floribus arcte imbricatis obcompressis triquetris ; squamis exterioribus tribus, quam interiores multo brevioribus lanceolatis vel ovato-lanceolatis acutis, in parte superiore ochraceo-pubescentibus, carina subrigida, marginibus tenue membranaceis, squamis interioribus (sepalis) 3 ovato-lanceolatis acutis rigidioribus opacis 3.5 mm. longis ; staminibus 5 glabris, filamentis gracillimis 1.7 mm. longis, antheris 1.3 mm. longis ; staminodeis 5 tenuibus filamento subaequantibus, apice argute 2–3-partitis ; ovario obovoideo, stylo breve crasso cum stigmate depresse-globoso. — Culpepper Isl. : 10 December, 1898, *Snodgrass & Heller*, no. 1 (hb. Gr.). A species to be readily distinguished from its Galapageian congeners by its broadly ovate or suborbicular stem-leaves. Endemic. Plate 1, figs. 5, 6, and 7.

Var. **obtusior**, nov. var. Conspicue ochracea; foliis omnibus latissime oblongis vel ovato-oblongis obtusissimis. — Wenman Isl. : 14 December, 1898, *Snodgrass & Heller*, no. 7 (hb. Gr.). Endemic. Plate 1, fig. 8.

T. nudicaulis, Moq.-Tand. in DC. Prodr. xiii. pt. 2, 369 (1849); Anderss. (1), 167, & (2), 62, t. 5, f. 1 ; Rob. & Greenm. (1), 148. *T. flavicoma*, Rob. & Greenm. (1), 148, in part (as to pl. Chatham Isl.). *Bucholtzia nudicaulis*, Hook. f. (3), 191. — Galapagos Ids. : without further data (hb. Gr.). Albemarle Isl. : eastern portion, Cowley Bay, *Baur*, no. 294 (hb. Gr.) ; southern part. *Baur*, no. 293 (hb. Gr.) ; on mountain east of Tagus Cove, alt. 925 m., *Snodgrass & Heller*, no. 249 (hb. Gr.). Charles Isl. : *Darwin ;* in very dry places, *Andersson* (hb. Gr.). Chatham Isl. : northern part, *Baur*, no. 292 (hb. Gr.), leafless and doubtful. Duncan Isl. : *Snodgrass & Heller*, no. 710 (hb. Gr.). James Isl. : Orchilla Bay, *Baur*, no. 295 (hb. Gr.). Further distrib. S. Chili, *J. G. Reynolds* (hb. Gr.) !

T. rugulosa, nov. sp., frutex arborescens ; ramulis teretibus dichotomis griseis et breviter stellato-tomentellis mox glabrescentibus ; foliis oppositis graciliter petiolatis oblongis penninerviis supra rugulosis tenuissime stellato-pubescentibus subtus multo pallidioribus canescentibus tomentellis basi cuneatis apice rotundatis vel obtusis apiculatisque ; spicis in dichotomis sessilibus ovoideis vel breviter teretibus albidis ; bracteis lanceolatis acutissimis apice plus minusve reflexis vel unciuatis ; sepalis exterioribus lanceolatis hyalinis acutissimis glabris carina rigidiuscula ; interioribus

ovati-lanceolatis basi atrobrunneis valde nervatis et inter nervis albo-pubescentibus apice recto vel leviter recurvato; antheris linearibus staminodiis linearibus paullo indivisis superantibus. — *Alternanthera frutescens*, Rob. & Greenm. (1), 148, not R. Br. — Chatham Isl.: southwest end, middle region, June, 1891, *Baur*, no. 290 (hb. Gr.). Endemic. Leaf-blade 3 to 5 cm. long, 1.2 to 2 cm. broad; spikes 8 to 11 mm. long, 6 to 9 mm. in thickness. Nearly related to *T. frutescens*, Moq. in DC. Prodr. xiii. pt. 2, 365, but differing in the contour and rugosity of its leaves.

T. **Snodgrassii**, nov. sp., suffrutescens a basi valde ramosa; ramis oppositis vel alternis teretibus leviter striatis pallidis breviter adpresse et sordide pubescentibus vel novellis canescentibus tomentulosis ad nodos paullo incrassatis supra nodis non constrictis; foliis spatulatis adpresse pubescentibus erectis apice obtusis basi cuneatis sessilibus; spicis sessilibus ovoideis parvis albidis; bracteis late ovatis carinatis hyalinis acutis cuspidatis glabris adpressis apice rectis sepalis exterioribus bracteis similibus sub apice pubescentibus interioribus longioribus ovatis acutis basi atro-brunneis valde nervatis in parte superiore patente flavescentipilosis; filamentis filiformibus staminodiis oblongis apice laceratis. — Seymour Isl.: north, May, 1899, *Snodgrass & Heller*, no. 578 (hb. Gr.). Endemic. Leaves 2.4 to 5 cm. long, 7 to 10 mm. broad; spikes 4 to 5 mm. in diameter. Plate 2, fig. 2.

T. strictiuscula, Anderss. (1), 166. *T. angustata*, Anderss. (2), 61, t. 4, f. 2; Rob. & Greenm. (1), 148. *T.* sp. Rose, (1), 137. — Galapagos Ids.: *Habel.* Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 52 (hb. Gr.), 88 (hb. Gr.), 863 (hb. Gr.); southern portion, *Baur*, no. 302 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr.); southwest end, lower region, *Baur*, no. 303 (hb. Gr.); *Snodgrass & Heller*, no. 502 (hb. Gr.). Narborough Isl.: southern part, not common, *Snodgrass & Heller*, no. 347 (hb. Gr.). Endemic. In his second publication Andersson credits this species to James Island, instead of Chatham Island as in his original description. A portion of the type material in hb. Gray is, however, labelled Chatham Island, where furthermore the species has been rediscovered by several subsequent collectors.

T. vestita, Anderss. (1), 169, & (2), 63, t. 4, f. 1; Rob. & Greenm. (1), 148. — Indefatigable Isl.: in dry grassy places of the middle region, *Andersson;* south of Conway Bay, *Baur*, no. 304 (hb. Gr.). Endemic

BATIDACEAE.

Batis, L.

B. maritima, L. Syst. Nat. ed. 10, 1376 (1760). — James Isl.: James Bay, near salt ponds in sand, *Snodgrass & Heller*, no. 355 (hb. Gr.). Widely distrib. on trop. shores.

BASELLACEAE.

Boussingaultia, HBK.

B. baselloides, HBK. Nov. Gen. & Sp. vii. 196, t. 645 (1825); Hook. f. (3), 193; Anderss. (1), 227, & (2), 97. — Charles Isl.: *Darwin*. Further distrib. Mex., W. Ind., trop. S. Am.

PHYTOLACCACEAE.

Phytolacca, L.

P. decandra, L. Sp. ed. 2, 631 (1763); Hook. f. (3), 193; Anderss. (1), 227, & (2), 97. — James Isl.: *Darwin*, acc. to Hook. f. Further distrib. U. S. and Canada. It is probable that the Galapageian plant, which curiously enough has not been secured by any subsequent collector, will prove to be *P. octandra* L., or a related trop. American species.

NYCTAGINACEAE.

Boerhaavia, L.

B. erecta, L. Sp. 3 (1753); Hook. f. (3), 193; Anderss. (1), 170, & (2), 64. — Albemarle Isl.: *Macrae*. Chatham Isl.: *Andersson* (hb. Gr.). Indefatigable Isl.: *Andersson*.

B. paniculata, Rich. Act. Soc. Hist. Nat. Par. i. 105 (1792); Anderss. (1), 171, & (2), 64. *B. decumbens*, Vahl, Enum. i. 284 (1804); Hook. f. (3), 193. — James Isl.: *Darwin*, and acc. to Anderson, l. c. (but probably by error) *Scouler*. Further distrib. S. United States, Mex., trop. S. Am. The identity of the Galapageian plant is doubtful.

B. scandens, L. Sp. 3 (1753); Hook. f. (3), 193; Anderss. (1), 170, & (2), 64. — Charles Isl.: *Darwin;* stony, grassy ground in the middle and lower region, *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 427 (hb. Gr.). Chatham Isl.: *Andersson; Snodgrass & Heller*, no. 527 (hb. Gr.). Indefatigable Isl.: *Andersson*. James Isl.: *Darwin*. Further distrib. S. United States, Mex., W. Ind., S. Am.

B. VISCOSA, Lag. & Rod. Anal. Cienc. Nat. iv. 256 (1801); *B. hirsuta*, Hook. f. (3), 193; Choisy in DC. Prodr. xiii. pt. 2, 451, in part; Anderss. (1), 170, & (2), 64; Rob. & Greenm. (1), 147; not Jacq., nor L., nor Willd. *B. diffusa*, Anderss. (1), 171, & (2), 64, not L. *B. glandulosa*, Anderss. (1), 171, & (2), 64. — ALBEMARLE ISL.: *Macrae; Andersson;* Tagus Cove, common in tufa soil up to 300 m., *Snodgrass & Heller*, no. 170 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, no. 252 (hb. Gr.). CHARLES ISL.: in grassy, stony places, *Andersson* (hb. Gr.); *Lee* (hb. U. S. Nat. Mus.); southwest end lower region, *Baur*, no. 309 (hb. Gr.); *Snodgrass & Heller*, no. 428 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); *Baur; Snodgrass & Heller*, no. 543 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 622 (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass & Heller*, no. 670 (hb. Gr.). JAMES ISL.: James Bay, on bluffs near the beach, *Snodgrass & Heller*, no. 377 (hb. Gr.). Although I have not seen original material of Andersson's *B. glandulosa* I find plants from Albemarle collected by Messrs. Snodgrass & Heller, which correspond so closely with Andersson's description that I cannot avoid the conclusion that they represent just what Andersson had. Nevertheless the plants seem to be only starved and dwarfed *B. viscosa*, growing as Andersson says *in locis sterilissimis*. Further distrib. S. W. United States, Mex., W. S. Am. southward to Chili.

CRYPTOCARPUS, HBK.

C. PYRIFORMIS, HBK. Nov. Gen. & Sp. ii. 188, t. 124 (1817); Hook. f. (3), 193; Anderss. (1), 161, & (2), 58; Rob. & Greenm. (1), 147. — GALAPAGOS IDS.: *Edmonston* (hb. Gr.); *Habel.* ALBEMARLE ISL.: Elizabeth Bay, on lava fields near beach, *Snodgrass & Heller*, no. 941 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 912 (hb. Gr.). BARRINGTON ISL.: *Baur*, acc. to Rob. & Greenm. l. c. (specimen not in hb. Gr., but sent to hb. Clark Univ.). BINDLOE ISL.: *Snodgrass & Heller*, no. 786 (hb. Gr.). CHARLES ISL.: *Baur*, acc. to Rob. & Greenm. l. c. (specimen not in hb. Gr., but sent to hb. Clark Univ.). CHATHAM ISL.: *Darwin.* HOOD ISL.: *Baur*, no. 306 (hb. Gr.). JAMES ISL.: James Bay, *Baur*, no. 305 (hb. Gr.); forming dense thickets 1 to 1.3 m. high on lava coast, *Snodgrass & Heller*, no. 372 (hb. Gr.). NARBOROUGH ISL.: east side, *Snodgrass & Heller*, no. 922 (hb. Gr.). Further distrib. Ecuador, Bolivia.

Pisonia, L.

P floribunda, Hook. f. (3), 193; Choisy in DC. Prodr. xiii. pt. 2, 447; Anderss. (1), 171, & (2), 65. — Albemarle Isl.: Iguana Cove, *Snodgrass* & *Heller*, no. 65 (hb. Gr.). James Isl.: *Darwin*. Endemic.

Nyctaginacea? — Seymour Isl.: north, *Snodgrass* & *Heller*, no. 574 (hb. Gr.). A weak, armed shrub with orbicular petiolate leaves recalling those of a *Boerhaavia*. Sterile and indeterminate.

AIZOACEAE.

Mollugo, L.

M. flavescens, Anderss. (1), 226, & (2), 96, t. 15, f. 2; Rob. & Greenm. (1), 146 as to pl. Chatham and pl. Albemarle. ? *M. verticillata*, Hook. f. (3), 232; Anderss. (1), 225, & (2), 96; not L. — Albemarle Isl.: *Darwin*, identity doubtful; *Macrae*, identity doubtful; *Baur*, identity doubtful. Charles Isl.: *Snodgrass* & *Heller*, no. 441 (hb. Gr.). Chatham Isl.: *Darwin*, identity doubtful; *Andersson* (hb. Gr.); northern part, *Baur*, no. 155 (hb. Gr.); southwestern part, lower region, *Baur*, no. 154 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass* & *Heller*, no. 667 (hb. Gr.). Endemic.

In all these specimens so far as seen the pedicels are rather short, some ascending, others deflexed. Distinguishable is

Var. **floriana**. *M. flavescens*, Rob. & Greenm. l. c. as to pl. Charles Isl. Pedicellis 4–9 mm. longis, omnibus erectis vel adscendentibus; floribus paulo quam illi formæ typicæ majoribus. — Charles Isl.: Cormorant Bay, *Baur*, no. 137. Endemic. In this variety as in the typical form the seeds are black, dull, and minutely tessellated.

M. gracillima, Anderss. (1), 226, & (2), 96; Rob. & Greenm. (1), 146. *M. gracilis*, Anderss. (2), t. 15, f. 3. — Galapagos Ids.: *Habel*. Albemarle Isl.: Iguana Cove, *Snodgrass* & *Heller*, nos. 79 (hb. Gr.), 122 (hb. Gr.); Tagus Cove, abundant everywhere up to 300 m. alt., *Snodgrass* & *Heller*, no. 192 (hb. Gr.). Charles Isl.: in the driest parts of the lower region, *Andersson* (hb. Gr.). James Isl.: Orchilla Bay, *Baur*, no. 153 (hb. Gr.). Endemic. By Hook. f. & Jacks. Ind. Kew. ii. 253, this species is reduced to *M. verticillata*, L. It differs, however, in several ways, namely by having smaller flowers, a shorter capsule relatively to the blunter sepals and in its minute black tessellated, not ribbed seeds.

M. **Snodgrassii**, nov. sp., perennans; radice crassa; caudice ramosa crassa nodosa plus minusve suberifera; caulibus pluribus erectis ramosis nodosis nunc geniculatis subscopariis teretibus striatulis glaberrimis 3 dm. altis; internodiis perlongis (saepe 7 cm.); foliis crassiusculis, radicalibus spatulatis 1.6 cm. longis, 6 mm. latis apice rotundatis caulinibus anguste linearibus obtusis vel acutis glaberrimis vel minutissime papillosis 1–2 cm. longis 1.2 mm. latis, umbellis 2–6 floribus sessilibus; pedicellis 4–15 mm. longis capillaribus; sepalis ellipticis obtusis 3(–5)-nerviis 4 mm. longis staminibus 7 sepalis paulo superantibus; filamentis gracilibus glaberrimis; ovario ovoideo obtusissimo; stylis 3 filiformibus; stigmatibus plus minusve elongatis subrecurvatis; capsula 3 mm. longa; seminibus subglobosis nigrescentibus glaberrimis lucidis sub lenti lineas concentrice curvatas exhibentibus. — ALBEMARLE ISL.: Elizabeth Cove, 15 February, 1899, *Snodgrass* & *Heller*, no. 268 (hb. Gr.). Tagus Cove, 20 January, 1899, *Snodgrass* & *Heller*, no. 914 (hb. Gr.). NARBOROUGH ISL.: Mangrove Point, common, scattered everywhere in crevices of lava from near the beach to 600 m. alt., April, 1899, *Snodgrass* & *Heller*, no. 309 (hb. Gr., type); east side, *Snodgrass* & *Heller*, no. 921 (hb. Gr.). Endemic. Well marked among its Galapageian congeners by its perennial habit, suberiferous base, long pedicels, large flowers, etc.

SESUVIUM, L.

S. EDMONSTONEI, Hook. f. (3), 221; Anderss. (1), 225, & (2), 95; Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: *Edmonston* (hb. Gr.); *Habel*. BARRINGTON ISL.: *Baur*, no. 151 (hb. Gr.). CHARLES ISL.: *Goodridge*. GARDNER ISL.: *Snodgrass* & *Heller*, no. 638 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 561 (hb. Gr.). Endemic.

S. PORTULACASTRUM, L. Syst. Nat. ed. 10, 1058 (1760). *S. Portulacastrum*, var. *revolutum*, Sims, Bot. Mag. xli. t. 1701. *Portulaca Portulacastrum*, L. Sp. 446 (1753). — ALBEMARLE ISL.: Elizabeth Cove, *Snodgrass* & *Heller*, no. 265 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 561 a (hb. Gr.). Further distrib. S. United States, Mex., W. Ind., S. Am., China, etc.

TRIANTHEMA, L.

T. PORTULACASTRUM, L. Sp. 223 (1753); Moench, Meth. 700. *T. monogyna*, L. Mant. i. 69 (1767); DC. Pl. Gras. t. 109; Anderss. (1), 225, & (2), 95; Rob. & Greenm. (1), 146. — BARRINGTON ISL.:

Snodgrass & *Heller*, no. 480 (hb. Gr.). CHARLES ISL.: *Andersson* (hb. Gr.); Cuevas Bay, *Baur*, no. 152 (hb. Gr.); *Snodgrass* & *Heller*, no. 409 (hb. Gr.). CHATHAM ISL.: *Andersson*. DUNCAN ISL.: *Snodgrass* & *Heller*, nos. 713 (hb. Gr.), 714 (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, no. 630 (hb. Gr.). HOOD ISL.: *Snodgrass* & *Heller*, no. 737 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson*. JAMES ISL.: *Andersson*. SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 575 (hb. Gr.); south, *Snodgrass* & *Heller*, no. 588 (hb. Gr.). Further distrib. S. United States, Mex., W. Ind., S. Am., E. Ind.

PORTULACACEAE.

PORTULACA, L.

P. OLERACEA, L. Sp. 445 (1753). *P. parvifolia*, Haw. Syn. Pl. Succ. 122 (1812); Anderss. (1), 225, & (2), 95. — GALAPAGOS IDS.: *Habel*. ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, no. 30 (hb. Gr.). CHARLES ISL.: in cultivated ground of lower region, *Andersson*; *A. Agassiz* (hb. U. S. Nat. Mus.); *Snodgrass* & *Heller*, no. 409a (hb. Gr.). CHATHAM ISL.: *Snodgrass* & *Heller*, no. 528 (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, nos. 619 (hb. Gr.), 620 (hb. Gr.). HOOD ISL.: *Snodgrass* & *Heller*, no. 735 (hb. Gr.). Further distrib. cosmop. None of the earlier explorers in the Galapagos Ids. mention this weed of cultivated ground. It was first noted in the group by *Andersson* on Charles Isl. in 1852, and its present much more general distribution among the islands well shows the fact that intercommunication between them must now be such as to carry seeds frequently from one to the other.

P. sp.? — WENMAN ISL.: *Snodgrass* & *Heller*, no. 916 (hb. Gr.), sterile and indeterminate.

CARYOPHYLLACEAE.

DRYMARIA, Willd.

D. CORDATA, Willd. ex Roem. & Schultes, Syst. v. 406 (1819); Rob. & Greenm. (1), 145. *D. glaberrima*, Bart. in J. & C. Presl. Rel. Haenk. 7 (1835), so far as char. goes; Hook. f. (3), 232; Anderss. (1), 227, & (2), 97; Caruel (1), 623. — CHATHAM ISL.: *Chierchia*; southwest end, upper region, *Baur*, no. 3 (hb. Gr.). JAMES ISL.: *Darwin*. From Bartling's detailed description of his *D. glaberrima*, I cannot avoid the conclusion that it is *D. cordata*. Further distrib. Mex., W. Ind., S. Am.

MENISPERMACEAE.

Cissampelos, L.

C. Pareira, L. Sp. 1031 (1753); Lam. Ill. t. 830; Hook. f. (3), 233; Anderss. (1), 220, & (2), 92; Caruel (1), 624; Rob. & Greenm. (1), 145. *C. testudinum*, Miers, Contrib. iii. 143 (1864–1871). — Abingdon Isl.: *Snodgrass & Heller*, no. 849 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 67 (hb. Gr.), 91 (hb. Gr.), 871 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 221 (hb. Gr.), 902 (hb. Gr.). Charles Isl.: *Darwin;* in the upper region, *Andersson; Chierchia; Baur*, no. 2 (hb. Gr.). Chatham Isl.: southwest end, upper region, *Baur*, no. 1 (hb. Gr.). James Isl.: *Darwin.* Further distrib. general in trop. regions. Miers, l. c., separates the Galapageian plant as *C. testudinum*, but good distinctions are not evident.

CRUCIFERAE.

Brassica, L.

B. campestris, L. Sp. 666 (1753). — Charles Isl.: *Snodgrass & Heller*, no. 406 (hb. Gr.). Further distrib. cosmop.

B. Sinapistrum, Boiss. Voy. Esp. ii. 39 (1839–1845). *Sinapis arrensis*, L. Sp. 668 (1753); Anderss. (1), 220, & (2), 93. — Charles Isl.: cultivated ground in upper and middle region, *Andersson.* Further distrib. cosmop.

Raphanus, L.

R. sativus, L. Sp. ed. 2, 935 (1763); Anderss. (1), 220, & (2), 93. — Charles Isl.: cultivated ground in middle and upper regions, *Andersson.* Further distrib. cosmop. through cult.

Senebiera, Poir.

S. pinnatifida, DC. Mém. Soc. Hist. Nat. Par. vii. 144, t. 9 (1799); Hook. f. (3), 233; Anderss. (1), 221, & (2), 93. *S. didyma*, Pers. Syn. ii. 185 (1807). *Lepidium didymum*, L. Mant. 92 (1767). *Coronopus didymus*, Smith, Fl. Brit. ii. 691. — James Isl.: *Darwin.* Further distrib. cosmop.

ROSACEAE?

Sanguisorbea? Wolf (1), 283, & (2), 259. — Charles Isl.: acc. to Wolf. Probably an error. Plant described as thorny and with pinnate leaves.

LEGUMINOSAE.

Acacia, Willd.

A. farnesiana, Willd. Sp. iv. 1083 (1806). *A. Cavenia*, Bert. ex Bull. Férussac, xx. 108 (1830), acc. to Hook. f. & Jacks. Ind. Kew. i. 7; Hook. & Arn. Bot. Beech. 21 (1830); Hook. f. (3), 228; Anderss. (1), 255, & (2), 113. — Albemarle Isl.: *Darwin; Macrae.* Further distrib. extra trop. S. Am., also the Texano-Mexican region?

A. macracantha, H. & B. in Willd. Sp. iv. 1080 (1806); Kunth, Mimos. t. 28; Benth. Trans. Linn. Soc. xxx. 500; Rob. & Greenm. (1), 146. *A. flexuosa*, H. & B. in Willd. l. c. 1082 (1806); Hook. f. (3), 229; Anderss. (1), 256, & (2), 113. — Galapagos Ids.: *Habel.* Charles Isl.: *Baur; Snodgrass & Heller*, no. 415 (hb. Gr.). Chatham Isl.: *Andersson.* Indefatigable Isl.: south of Conway Bay, *Baur*, no. 94 (hb. Gr.). James Isl.: *Scouler.* Further distrib. S. Am., W. Ind. An *Acacia* mentioned by Caruel (1), 623, as collected on Charles Isl., by *Chierchia* may well have been this species.

A. tortuosa, Willd. Sp. iv. 1083 (1806); Benth. Trans. Linn. Soc. xxx. 501; Rob. & Greenm. (1), 146. *A. tortuosa*, var. *glabrior*, Hook. f. (3), 229; Anderss. (1), 256, & (2), 113. *A. albida*, Lindl. Bot. Reg. t. 1317 (1830). — Charles Isl.: grassy places, middle region, *Andersson.* Chatham Isl.: similar situations, *Andersson.* James Isl.: *Scouler; Darwin;* Orchilla Bay, *Baur*, no. 65 (hb. Gr.); James Bay, *Baur*, no. 64 (hb. Gr.). Further distrib. Mex., W. Ind., northern S. Am.

A. sp. affin. *A. macracantha*, H. & B. — Albemarle Isl.: mountain north of Elizabeth Cove, *Snodgrass & Heller*, no. 283 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 161 (hb. Gr.). In its minute leaflets, velvety branchlets, and small spines this is very different from the preceding or indeed from any specimen of *A. macracantha* at hand. The species, however, has been so widely drawn by Bentham, l. c., and contains such an aggregation of old species, that it is impossible to characterize with confidence any new species of this affinity until the whole group can be worked over again.

A. sp.? Hook. f. (4) 261. — Charles Isl.: *Edmonston*, acc. to Hook. f., l. c.

A. sp. — James Isl.: *Snodgrass & Heller*, no. 398 (hb. Gr.). Near *A. tortuosa*, but with larger leaflets.

Astragalus, L.

A. Edmonstonei. *Phaca Edmonstonei*, Hook. f. (3), 227; Anderss. (1), 249, & (2), 110. — Galapagos Ids.: *Du Petit-Thouars.* Charles Isl.: *Edmonston.* Endemic. Not secured by Andersson or any subsequent collector.

Caesalpinia, L.

C. Bonducella, Fleming in As. Res. xi. 159 (1810); Rob. & Greenm. (1), 146. — Albemarle Isl.: *Baur*, no. 79 (hb. Gr.). Further distrib. general in warm reg.

C. pulcherrima; Sw. Obs. 166 (1791); Maund, Bot. iv. t. 151. *Poinciana pulcherrima*, L. Sp. 380 (1753); Hook. f. (4), 261; Anderss. (1), 253, & (2), 112; Caruel (1), 624. — Charles Isl.: *Edmonston*, as a relic of former cultivation acc. to Andersson. Chatham Isl.: *Chierchia.* Further distrib. cosmop. trop.

Canavalia, Adans.

C. obtusifolia, DC. Prodr. ii. 404 (1825); Mart. Fl. Bras. xv. pt. 1, 178, t. 48. *Dolichos obtusifolius*, Lam. Dict. ii. 295 (1786). — Galapagos Ids.: *Habel.* Bindloe Isl.: *Snodgrass & Heller*, no. 770 (hb. Gr.). Further distrib. general in tropics.

Cassia, L.

C. hirsuta, L. Sp. i. 378; Benth. in Mart. Fl. Bras. xv. pt. 2, 114, to 34, f. 1, & Trans. Linn. Soc. xxx. 534. — Charles Isl.: *Lee* (hb. U. S. Nat. Mus.). Further distrib. Peru to Mex. and Brazil. Professor Lee's plant is only in flower and the identification is subject to some doubt.

C. occidentalis, L. Sp. 377 (1753); DC. Prodr. ii. 497; Benth. Trans. Linn. Soc. xxvii. 532; Lindl. Bot. Reg. t. 83; Anderss. (1), 254, & (2), 112; Caruel, (1), 624; Rose (1), 137; Rob. & Greenm. (1), 146. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 68 (hb. Gr.), 95 (hb. Gr.). Charles Isl.: in grassy places of the upper region, *Andersson; Snodgrass & Heller*, no. 425 (hb. Gr.), a form with unusually obtuse leaflets. Chatham Isl.: in grassy places of the middle region, *Andersson; Chierchia; A. Agassiz* (hb. Gr. & hb. U. S. Nat. Mus.); southwest end, middle region, *Baur*, no. 85 (hb. Gr.); *Snodgrass & Heller*, no. 556 (hb. Gr.). Widely distrib.

C. PICTA, Don, Syst. ii. 444 (1832); Hook. f. (3), 229; Anderss. (1), 255, & (2), 112; Benth. Trans. Linn. Soc. xxvii. 552; Rose (1), 137. *C. applanata*, Anderss. (1), 254, acc. to Benth. l. c. — ALBEMARLE ISL.: *Macrae;* Iguana Cove, *Snodgrass & Heller*, no. 48 (hb. Gr.); Tagus Cove, not common near the shore but abundant inland at 150 m. alt., flowers Feb. to the middle of Mar., *Snodgrass & Heller*, no 169. CHATHAM ISL.: *Darwin; Andersson* (hb. Gr.); *A. Agassiz.* Further distrib. Ecuador.

C. SERICEA, Sw. Prodr. 66 (1788), & Fl. Ind. Occ. 724; Benth. in Mart. Fl. Bras. xv. pt. 2, 116, t. 35, f. 1; Anderss. (1), 254, & (2), 112. — CHATHAM ISL.: *Andersson.* INDEFATIGABLE ISL.: lower region, *Andersson.* SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 607 (hb. Gr.). Further distrib. Mex., W. Ind., trop. S. Am.

CROTALARIA, L.

C. GLABRESCENS, Anderss. (1), 248, & (2), 109; Rose (1), 137. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: Tagus Cove, *Snodgrass & Heller*, no. 176 (hb. Gr.). CHATHAM ISL.: *Andersson; ?A. Agassiz* acc. to Rose, l. c. Endemic.

C. PUMILA, Ort. Dec. ii. 23 (1797); DC. Prodr. ii. 132; Anderss. (2), 109. *C. lupulina*, HBK. Nov. Gen. & Sp. vi. 402, t. 590 (1823); DC. Prodr. ii. 133; Hook. f. (3), 225; Anderss. (1), 248, & (2), 109. *C. puberula*, Hook. f. (3), 225; Anderss. (1), 248, & (2), 109; Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: *Darwin;* Iguana Cove, *Snodgrass & Heller*, no. 98 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 174 (hb. Gr.), 878 (hb. Gr.). CHARLES ISL.: *Darwin;* in the upper region, *Andersson; Snodgrass & Heller*, no. 435 (hb. Gr.). CHATHAM ISL.: in grassy places of the middle region, *Andersson;* southwest end, middle region, *Baur*, no. 99 (hb. Gr.); southwest end, upper region, *Baur*, no. 98 (hb. Gr.); *Snodgrass & Heller*, no. 554 (hb. Gr.). JAMES ISL.: James Bay, common everywhere, *Snodgrass & Heller*, no. 391 (hb. Gr.). NARBOROUGH ISL.: southern part, *Snodgrass & Heller*, no. 323 (hb. Gr.). SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 610 (hb. Gr.). Further distrib. W. Ind., Mex.

C. SETIFERA, DC. Prodr. ii. 131 (1825); A. DC. Calques des Dess. t. 226. — ALBEMARLE ISL.: Tagus Cove, alt. 1230 m., *Snodgrass & Heller*, nos. 879 (hb. Gr.), 882 (hb. Gr.). Further distrib. Mex., Centr. Am.

Dalea, L.

D. parvifolia, Hook. f. (3), 225; Anderss. (1), 249, & (2), 109; Rob. & Greenm. (1), 146. — Albemarle Isl.: Tagus Cove, on mountain, alt. 215 to 460 m., bush 1 to 2 m. high, *Snodgrass & Heller*, no. 222 (hb. Gr.). Charles Isl.: *Baur*, no. 102 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.). Indefatigable Isl.: south of Conway Bay, *Baur*, no. 104 (hb. Gr.). James Isl.: *Darwin; Baur*, no. 103 (hb. Gr.). Endemic.

D. tenuicaulis, Hook. f. (3), 226; Anderss. (1), 249, & (2), 110; Rob. & Greenm. (1), 146. — Albemarle Isl.: *Darwin;* southern part, *Baur*, no. 105 (hb. Gr.). Chatham Isl.: *Andersson*. Endemic.

Desmanthus, Willd.

D. depressus, H. & B. ex Willd. Sp. iv. 1046 (1806); Kunth, Mimos. 115, t. 35; Hook. f. (3), 228; Anderss. (1), 255, & (2), 113; Benth. Trans. Linn. Soc. xxx. 386; Rose (1), 137; Rob. & Greenm. (1), 146. — Charles Isl.: *Darwin*. Chatham Isl.: *A. Agassiz*, acc. to Rose, l. c.; southwestern end, middle region, *Baur*, no. 77 (hb. Gr.). Duncan Isl.: *Snodgrass & Heller*, no. 704 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 627 (hb. Gr.). Hood Isl.: *Baur*, no. 78 (hb. Gr.); *Snodgrass & Heller*, no. 749 (hb. Gr.), no. 750 (hb. Gr.). Further distrib. S. United States, Mex., W. Ind., S. Am.

Desmodium, Desv.

D. galapagense. *D. filiforme*, Hook. f. (3), 227; Anderss. (1), 249, & (2), 110; not Zoll. & Mor. — James Isl.: *Darwin*. Endemic.

D. incanum, DC. Prodr. ii. 332 (1825); Caruel, (1), 624; Rob. & Greenm. (1), 146. — Chatham Isl.: *Chierchia;* southwest end, middle region, *Baur*, no. 71 (hb. Gr.); also a questioned variety of this species, *Chierchia*, acc. to Caruel, (1), 624. Further distrib. Mex., W. Ind., S. Am.

D. molle, DC. Prodr. ii. 332; Anderss. (1), 250, & (2), 110; Rob. & Greenm. (1), 146. — Abingdon Isl.: *Snodgrass & Heller*, no. 824 (hb. Gr.). Albemarle Isl.: rather common in tufa soil up to 185 m. alt., *Snodgrass & Heller*, no. 203 (hb. Gr.). Bindloe Isl.: *Baur*, no. 83 (hb. Gr.); *Snodgrass & Heller*, no. 765 (hb. Gr.). Charles Isl. *Andersson; Baur*. Gardner Isl.: *Snodgrass & Heller*, no. 618 (hb. Gr.). Hood Isl.: *Baur*, no. 84 (hb. Gr.); *Snodgrass & Heller*,

no. 727 (hb. Gr.). INDEFATIGABLE ISL.: *Baur;* northern part, *Snodgrass* & *Heller*, no. 652 (hb. Gr.). JERVIS ISL.: *Baur*, no. 81 (hb. Gr.). Not noticed by Darwin and the earlier collectors, and found only on one island (Charles) by Andersson; hence probably a recently introduced although now generally distributed plant in the islands. Further distrib. general in trop. and sub-trop. Am.

D SPIRALE, DC. Prodr. ii. 332 (1825); Benth. in Mart. Fl. Bras. xv. pt. 1, 105; Rob. & Greenm. (1), 146. *D. tenuiculum*, DC. Prodr. ii. 333 (1825); Anderss. (1), 249, & (2), 110. — ALBEMARLE ISL.: Tagus Cove, tolerably common in shady places, from the beach to 300 m. alt., *Snodgrass* & *Heller*, no. 193 (hb. Gr.). BINDLOE ISL.: *Baur* (hb. Gr.). CHARLES ISL.: on dry places of middle region, *Andersson; Snodgrass* & *Heller*, no. 444 (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, no. 644 (hb. Gr.). HOOD ISL.: *Snodgrass* & *Heller*, no. 734 (hb. Gr.). JAMES ISL.: on rocks near beach, *Snodgrass* & *Heller*, no. 379 (hb. Gr.). SEYMOUR ISL.: south, *Snodgrass* & *Heller*, no. 609 (hb. Gr.). Further distrib. Mex., W. Ind., trop. S. Am.

D. UNCINATUM, DC. Prodr. ii. 331 (1825); Rob. & Greenm. (1), 146. — CHATHAM ISL.: southwest end, middle region, *Baur*, no. 93 (hb. Gr.). Further distrib. N. Am., S. Am.

ERYTHRINA, L.

E. VELUTINA, Willd. Ges. Naturf. Fr. Neue Schr. iii. 426 (1801); Hook. Bot. Mag. lx. t. 3227; Rob. & Greenm. (1), 146. — JAMES ISL.: James Bay, *Baur*, no. 72 (hb. Gr.). Further distrib. S. Am., W. Ind. This is doubtless the red-seeded tree mentioned in Nature, vi. 353 as observed on James Island by the members of the Hassler expedition.

GALACTEA, P. Br.

G. JUSSIAEANA, Kunth, var. VOLUBILIS, Benth. in Mart. Fl. Bras. xv. pt. 1, 143 (1859). *G. velutina*, Benth. in Hook. Jour. Bot. ii. 59 (1840); Anderss. (2), 111. *Phaseolus tomentosus*, Anderss. (1), 250. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, no. 63 (hb. Gr.); Tagus Cove, not common, *Snodgrass* & *Heller*, no. 208 (hb. Gr.). CHARLES ISL.: *Andersson*. CHATHAM ISL.: *Andersson* (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass* & *Heller*, no. 666 (hb. Gr.). NARBOROUGH ISL.: northern part, *Snodgrass* & *Heller*, no.

300 (hb. Gr.). Seymour Isl.: north, *Snodgrass & Heller*, no. 576 (hb. Gr.). Further distrib. S. Am.

Var. glabrescens, Benth. in Mart. Fl. Bras. xv. pt. 1, 143 (1859). Chatham Isl.: *Snodgrass & Heller*, no. 544 (hb. Gr.). Further distrib. Brazil.

G. n. sp., Hook. f. (4), 261. — Charles Isl.: *Edmonston*, acc. to Hook. f.

Geoffraea, L.

G. superba, H. & B. Pl. Aequin. ii. 69, t. 100 (1809) as *Geoffroya*. — Hood Isl.: *Snodgrass & Heller*, no. 738 (hb. Gr.). Further distrib. trop. S. Am. Not before reported from the Galapagos Ids.

Mimosa, L.

M. asperata, L. Syst. Nat. ed. 10, 1312 (1760); Benth. Trans. Linn. Soc. xxx. 437; Hook. f. (4), 262; Anderss. (1), 256, & (2), 113. *M. pellita*, Kunth, Mimos. 27, t. 9 (1819). — Charles Isl.: *Edmonston*. Further distrib. S. United States, Mex., W. Ind., S. Am., Afr., and Madagascar.

Neptunia, Lour.

N. plena, Benth. in Hook. Jour. Bot. iv. 355 (1842), & Trans. Linn. Soc. xxx. 383. *N. surinamensis*, Steud. Flora, xxvi. 759 (1843); Anderss. (1), 255, & (2), 113; Rob. & Greenm. (1), 146. Perhaps the *Piptadenia ?* sp. of Hook. f. (4), 262. — Charles Isl.: *Edmonston? Andersson;* Cuevas Bay, *Baur*, no. 69 (hb. Gr.). Chatham Isl.: in grassy places of the middle region, *Andersson; Baur; Snodgrass & Heller*, no. 495 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 626 (hb. Gr.). Indefatigable Isl.: south of Conway Bay, *Baur*, no. 66 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 658 (hb. Gr.). Jervis Isl.: *Baur*, no. 68 (hb. Gr.). Seymour Isl.: north, *Snodgrass & Heller*, no. 577 (hb. Gr.); south, *Snodgrass & Heller*, no. 603 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am.

Parkinsonia, L.

P. aculeata, L. Sp. 375 (1753); Benth. in Mart. Fl. Bras. xv. pt. 2, 76, t. 26; Hook. f. (4), 262; Anderss. (1), 253, & (2), 112; Rose (1), 137; Rob. & Greenm. (1), 146. — Galapagos Ids.: *Habel.* Albemarle Isl.: southern part, *Baur*, no. 75 (hb. Gr.). Charles Isl.: *Edmonston;* Cuevas Bay, *Baur*, no. 74 (hb. Gr.); *Snodgrass & Heller*, no. 405 (hb. Gr.). Chatham Isl.: *Andersson; A. Agassiz;*

southwestern part, lower region, *Baur*, no. 73 (hb. Gr.); *Snodgrass* & *Heller*, no. 498 (hb. Gr.). DUNCAN ISL.: *Baur*, no. 76 (hb. Gr.); *Snodgrass* & *Heller*, no. 693 (hb. Gr.). HOOD ISL.: *Baur*, no. 80 (hb. Gr.). SEYMOUR ISL.: south, *Snodgrass* & *Heller*, no. 606 (hb. Gr.). Further distrib. S. United States, Mex., W. Ind., S. Am.

PHASEOLUS, L.

P. ADENANTHUS, G. F. W. Mey. Prim. Fl. Esseq. 239 (1818). *P. truxillensis*, HBK. Nov. Gen. & Sp. vi. 451 (1823). — GALAPAGOS IDS.: *Habel.* HOOD ISL.: *Snodgrass* & *Heller*, no. 754 (hb. Gr.). Further distrib. tropics of the New World, also introd. (?) in E. Ind.

P. MOLLIS, Hook. f. (3), 228; Anderss. (1), 250, & (2), 110; ? Rob. & Greenm. (1), 146. — JAMES ISL.: *Darwin.* JERVIS ISL.: *Baur*, no. 86. (hb. Gr.), identity somewhat doubtful. Endemic.

P. SEMIERECTUS, L. Mant. i. 100 (1767); Jacq. Ic. t. 558; Bot. Reg. ix. t. 743; Rob. & Greenm. (1), 146. *P. cytisoides*, Anderss. (1), 251, & (2), 110, not Zoll. & Mor. — CHARLES ISL.: *Andersson* (hb. Gr.); *Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 88 (hb. Gr.); *Snodgrass* & *Heller*, no. 424 (hb. Gr.). CHATHAM ISL.: *Baur*; *Snodgrass* & *Heller*, no. 555 (hb. Gr.). Further distrib. general in the tropics.

PISCIDIA, L.

P. ERYTHRINA, L. Sp. ed. 2, 993 (1763); Hook. f. (3), 228; Anderss. (1), 253, & (2), 112. — CHATHAM ISL.: *Darwin*; *Snodgrass* & *Heller*, no. 503 (hb. Gr.). JAMES ISL.: ? Further distrib. trop. Am. There can be little doubt that this is the species with winged pods, mentioned in Nature, vi. 353, as observed by the members of the Hassler expedition.

PROSOPIS, L.

P. DULCIS, Kunth, Mimos. 110, t. 34 (1819); Hook. f. (3), 229; Anderss. (1), 255, & (2), 112; Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: *Habel.* ABINGDON ISL.: *Snodgrass* & *Heller*, no. 852 (hb. Gr.). CHARLES ISL.: *Darwin*, *Snodgrass* & *Heller*, no. 416 (hb. Gr.). CHATHAM ISL.: *Baur* (hb. Gr.); *Snodgrass* & *Heller*, no. 531 (hb. Gr.). DUNCAN ISL.: *Snodgrass* & *Heller*, nos. 694 (hb. Gr.), 695, (hb. Gr.). GARDNER ISL.: *Snodgrass* & *Heller*, no. 623 (hb. Gr.).

Hood Isl.: *Snodgrass & Heller*, no. 739 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 677 (hb. Gr.). James Isl.: James Bay, abundant near beach in sand and lava soil, *Snodgrass & Heller*, no. 366 (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 586 (hb. Gr.). Further distrib. Mex., S. Am.

Rhynchosia, Lour.

R. minima, DC. Mém. Leg. ix. 363 (1825), & Prodr. ii. 385; Hook. f. (3), 228; Anderss. (1), 251, & (2), 111; Rob. & Greenm. (1), 146. *R. punctata*, DC. Mém. Leg. ix. t. 56, & Prodr. ii. 385; Anderss. (1). 252, & (2), 111. *R. aureo-guttata*, Anderss. (1), 252, & (2), 111. *R. exigua*, Anderss. (1), 252, & (2), 111. — Galapagos Ids.: *Habel.* Abingdon Isl.: *Snodgrass & Heller*, no. 833 (hb. Gr.). Albemarle Isl.: *Darwin;* Iguana Cove, *Snodgrass & Heller*, nos. 62 (hb. Gr.), 121 (hb. Gr.); Elizabeth Bay, north mountain, *Snodgrass & Heller*, no. 286 (hb. Gr.); Tagus Cove, abundant from the beach to 300 m. alt., *Snodgrass & Heller*, nos. 207 (hb. Gr.), 901 (hb. Gr.), 154 (hb. Gr.), the last number representing the small-leaved form (*R. exigua* of Andersson). Barrington Isl.: *Baur*, no. 100 (hb. Gr.); *Snodgrass & Heller*. no. 477 (hb. Gr.). Bindloe Isl.: *Baur*, no. 101 (hb. Gr.). *Snodgrass & Heller*, no. 760 (hb. Gr.). Charles Isl.: *Andersson* (hb. Gr.). Chatham Isl.: *Darwin; Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 546 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 651 (hb. Gr.). Narborough Isl.: southern part, common up to 615 m. alt., *Snodgrass & Heller*, no. 313 (hb. Gr.). Further distrib. cosmop. trop. and subtrop.

R. reticulata, DC. Prodr. ii. 385 (1825); Hook. f. (3), 227; Anderss. (1), 251, & (2), 111. — Chatham Isl.: *Darwin*. Further distrib. trop. Am.

R. sp. — Albemarle Isl.: mountain east of Tagus Cove, *Snodgrass & Heller*, no. 250 (hb. Gr.), also below 650 m., *Snodgrass & Heller*, no. 905 (hb. Gr.)

R. sp. — Bindloe Isl.: *Snodgrass & Heller*, no. 773 (hb. Gr.). Sterile and doubtful.

Stylosanthes, Sw.

S. scabra, Vog. Linnaea, xii. 69 (1838); Taubert, Abh. Bot. Ver. Prov. Brandenb. xxxii. 24; Rob. & Greenm. (1), 146. — Abingdon Isl.: *Snodgrass & Heller*, no. 838 (hb. Gr.). Albemarle Isl.:

Tagus Cove, common up to 185 m. alt., *Snodgrass & Heller*, no. 171 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 90 (hb. Gr.); *Snodgrass & Heller*; no. 767 (hb. Gr.). CHARLES ISL.: *Baur*, no. 92 (hb. Gr.); *Snodgrass & Heller*, no. 450 (hb. Gr.). INDEFATIGABLE ISL.: *Baur* (no specimen in hb. Gr.); northern part, *Snodgrass & Heller*, no. 673 (hb. Gr.). JERVIS ISL.: *Baur*, no. 89 (hb. Gr.). Further distrib. Centr. & S. Am. Taubert, l. c., distinguishes the Galapageian plant seen in the Vienna Herbarium (coll. *Steindachner?*) as being villous-pubescent rather than scabrous. The material of the species at hand shows variation in its pubescence even upon the islands.

TEPHROSIA, Pers.

T. CINEREA, Pers. Syn. ii. 328 (1807). *T. litoralis*, Pers. l. c. 329; Hook. f. (3), 226 (*littoralis*); Anderss. (1), 249, & (2), 110; Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: *Du Petit-Thouars*, acc. to Hook. f.; *Habel.* ALBEMARLE ISL.: *Macrae;* Tagus Cove, not common, alt. 30 to 185 m., *Snodgrass & Heller*, no. 188 (hb. Gr.). BARRINGTON ISL.: *Snodgrass & Heller*, no. 483 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 97 (hb. Gr.); *Snodgrass & Heller*, no. 774 (hb. Gr.). CHARLES ISL.: in stony places of lower and middle region, *Andersson;* *Snodgrass & Heller*, no. 440 (hb. Gr.). CHATHAM ISL.: *Andersson;* *Baur* (not in hb. Gr.); *Snodgrass & Heller*, no. 545 (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass & Heller*, no. 682 (hb. Gr.). NARBOROUGH ISL.: abundant acc. to Mr. Heller's field notes. SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 601 (hb. Gr.). Further distrib. throughout trop. Am. The Galapageian plant often has a velvety spreading pubescence on the stem, but is apparently only a form of this common and widely distributed species.

VIGNA, Savi.

V. OWAHUENSIS, Vog. Linnaea, x. 585 (1836). *V. oahuensis*, A. Gray, Bot. U. S. Expl. Exped. i. 450. *V. owyhensis*, var., Hook. f. (3), 228. *V. owaihensis*, Anderss. (1), 251, & (2), 111. — JAMES ISL.: *Darwin*, a variety acc. to Hook. f., l. c., who also credits this Hawaiian species to Chili. The identity of the Galapageian plant with the typical Hawaiian needs further confirmation. Further distrib. Hawaiian Ids., "Chili." Acc. to Hemsl. in litt., a doubtful *Vigna* was secured on the Galapagos Islands by Dr. Habel.

OXALIDACEAE.

Oxalis, L.

O. carnosa, Molina, Sagg. Chile, ed. 2, 288 (1810); Lindl. Bot. Reg. t. 1063; Hook. Bot. Mag. t. 2866; Walp. Rep. i. 487; Anderss. (1), 247, & (2), 108; Rob. & Greenm. (1), 145. — Charles Isl.: at the summit, *Andersson*. Duncan Isl.: *Baur*, without number (hb. Gr.). Further distrib. Chili.

O. Cornelli, Anderss. (1), 246, & (2), 108. *O. Barrelieri*, Anderss. ll. cc., not L. *O. Agassizi*, Rose (1), 136; Rob. & Greenm. (1), 145. — Galapagos Ids.: *Habel*. Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 78 (hb. Gr.), and abundant near beach, *Snodgrass & Heller*, no. 118 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 197 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 471 (hb. Gr.). Charles Isl.: in sandy places, middle region, *Andersson* (hb. Gr.); *Baur* (no specimen in hb. Gr.). Chatham Isl.: in sterile parts of the upper region, *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 504 (hb. Gr.). Duncan Isl.: *A. Agassiz* (hb. Gr.); *Snodgrass & Heller*, no. 703 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no 621 (hb. Gr.). Hood Isl.: *Baur*, no. 35 (hb. Gr.); *Snodgrass & Heller*, no. 748 (hb. Gr.). Indefatigable Isl.: *Andersson;* south of Conway Bay. *Baur*, no. 36 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 672 (hb. Gr.). James Isl.: James Bay, common on sea bluff, *Snodgrass & Heller*, no. 390 (hb. Gr.). Endemic.

O. corniculata, L. Sp. 435 (1753); Rob. & Greenm. (1), 145.— Chatham Isl.: southwest end, upper region, *Baur* (hb. Gr.). Further distrib. cosmop.

LINACEAE.

Linum, L.

L. oligophyllum, Willd. ex Schult. Syst. vi. 758 (1820); Urban, Linnaea, xli. 634. — Albemarle Isl.: Tagus Cove Mountain, 215 to 925 m. alt., *Snodgrass & Heller*, nos. 225 (hb. Gr.), 898 (hb. Gr.). Further distrib. Andes of Ecuador and Peru.

ZYGOPHYLLACEAE.

Kallstroemia, Scop.

K. adscendens. *Tribulus adscendens*, Anderss. (1), 245. *T. maximus*, var. *adscendens*, Anderss. (2), 107. *T. maximus*, Rose (1), 136. —

CHARLES ISL.: *Andersson*. CHATHAM ISL.: *Andersson* (hb. Gr.). DUNCAN ISL.: *A. Agassiz* (hb. U. S. Nat. Mus.). GARDNER ISL.: *Snodgrass & Heller*, no. 615 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 756 (hb. Gr.). Endemic. This species is by its much shorter style, etc., clearly distinct from *K. maximus*, Wight & Arn. (*Tribulus maximus*, L). It is, however, exceedingly close to the plant recently characterized from the southwestern United States as *Kallstroemia brachystylis*, Vail, Bull. Torr. Club, xxiv. 206 (*Tribulus brachystylis*, Robinson, Syn. Fl. i. pt. 1, 354). The Galapageian plant, however, differs from the continental in slightly more slender habit, smaller and more unequal leaflets (usually 2 or 3 rather than 4 pairs), and more enduring sepals which persist even at the maturity of the fruit. *K. brachystylis* has been found in Mexico, but apparently not in S. America.

TRIBULUS, L.

T. CISTOIDES, L. Sp. 387 (1753); Hook. f. (3), 231; Anderss. (1), 244, & (2), 107.—ALBEMARLE ISL.: *Macrae*. CHARLES ISL.: *Snodgrass & Heller*, no. 400 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 743 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson* (hb. Gr.). JAMES ISL.: *Darwin*. SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 598 (hb. Gr.). Further distrib. general in warm and temperate countries.

Var. **anacanthus**, NOV. VAR. Formae typicae habitu foliisque similis; floribus plus minusve minoribus; petalibus 1–1.2 cm. longis; fructus carpellis vel tribus vel quatuor vel saepius omnibus ab aculeis omnino destitutis. — ALBEMARLE ISL.: *Lee* (hb. Gr. & hb. U. S. Nat. Mus.). Tagus Cove, March, 1899, common near beach and on sandy hillsides up to 200 m. alt., *Snodgrass & Heller*, nos. 163 (hb. Gr.), 165 (hb. Gr.), & 915 (hb. Gr.). Endemic.

T. SERICEUS, Anderss. (1), 245, & (2), 107; Rob. & Greenm. (1), 145. *T. servicens*, var. *humifusus*, Rose, (1), 136. — CHARLES ISL.: in lower arid region, *Andersson* (var. *humifusus*); *A. Agassiz*; *Baur*, no. 39 (hb. Gr.). CHATHAM ISL.; in lower arid region, *Andersson* (var. *erectus*), (hb. Gr.). Endemic but too near the cosmopolitan *T. terrestris*, L.

T. sp. — CULPEPPER ISL.; *Snodgrass & Heller*, no. 3 (hb. Gr.). A velvety-tomentose species with short internodes and geniculate stem. The specimens are sterile and indeterminate.

RUTACEAE.

Zanthoxylum, L.

Z. Pterota, HBK. Nov. Gen. & Sp. vi. 3 (1823); Hook. f. (3), 231; Anderss. (1), 244, & (2), 106; Rob. & Greenm. (1), 145 (*Xanthoxylon*). *Z. lentiscifolium*, Anderss. ll. cc. *Fagara Pterota*, L. Syst. Nat. ed. 10, 897 (1760); Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 117. *F. lentiscifolia*, H. & B. acc. to Willd. Enum. Hort. Berol. 165. — Galapagos Ids.: *Habel*. Abingdon Isl.: alt. 525 m., *Snodgrass & Heller*, no. 836 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 53 (hb. Gr.), 903 (hb. Gr.); mountain east of Tagus Cove, alt. 925 m., *Snodgrass & Heller*, no. 231 (hb. Gr.). Charles Isl.: *Andersson*, identity doubtful; *Lee* (hb. U. S. Nat. Mus.). Chatham Isl.: southwest end, middle region, *Baur*, no. 40 (hb. Gr.). James Isl.: *Darwin*. — Narborough Isl.: southern part, small tree, abundant at 615 m. alt., *Snodgrass & Heller*, no. 333 (hb. Gr.). Further distrib. S. United States, Mex., W. Ind., S. Am.

SIMARUBACEAE.

Castela, Turp.

C. galapageia, Hook. f. (3), 229, & (4), 262; Rob. & Greenm. (1), 145. *C. galapageja*, Anderss. (1), 243, & (2), 106. *C. Galapagei*, Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 4, 219.

This species, like *Euphorbia viminea* and several other Galapageian plants, shows pronounced formal differences on the different islands, thus:

Forma typica, inarmata; foliis lineari-lanceolatis acutis. — Chatham Isl.: *Darwin; Baur?*

Forma **albemarlensis**, inarmata vel aculeis parvis gracilibusque armatis; foliis oblongis obtusis mucronatis, 1.5–3.4 cm. longis, saepissime dentibus 1–2 parvis lateralibus instructis, supra haud lucidis. — Albemarle Isl.; southern part, *Baur*, no. 45 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 156 (hb. Gr.), 924 (hb. Gr.), the latter showing the hitherto undescribed fruit to be obovoid, 12 mm. long, 9 mm. thick, very smooth and shining.

Forma **bindloensis**, inarmata; foliis integerrimis, anguste obovatis, rotundatis vel mucronulatis, 1–1.6 cm. longis, supra haud lucidis. — Bindloe Isl.: *Baur*, no. 43 (hb. Gr.).

Forma **carolensis**, spinis brevibus robustioribus armata; foliis spatulatis basi manifeste attenuatis, demum supra valde lucidis 2–2.5 cm.

longis. — CHARLES ISL.: *Snodgrass & Heller*, no. 452 (hb. Gr.); *Baur*, no. 41 (hb. Gr.), and (?) *Baur*, no. 42 (hb. Gr.).

Forma **duncanensis**, inarmata; foliis anguste lanceolatis, base apiceque acutis. — DUNCAN ISL.: *Baur*, no. 47 (hb. Gr.). Perhaps only a young form.

Forma **jacobensis**, spinis perbrevibus armata; foliis late oblongis, integerrimis, basi apiceque rotundatis mucronatis supra lucidis et transverse rugulosis 1–1.3 cm. longis. — JAMES ISL.: a shrub 3 to 6 dm. high, in sand near beach, James Bay, *Snodgrass & Heller*, no. 364 (hb. Gr.).

Forma **jervensis**, spinis brevibus gracilibusque armata; foliis late oblongis integerrimis 1.7 cm. longis apice rotundatis margine valde revolutis supra haud lucidis. — JERVIS ISL.: *Baur*, no. 46 (hb. Gr.).

These forms possess, as will be seen from the above brief characters, rather striking differences. It is, however, very difficult to tell how much of this variation is due to permanent divergence of character and how much to individual environment and age. The species as a whole is very near *C. Nicholsonii*, Hook., but the branches do not exhibit the tendency to induration at the tip so conspicuous in the species just mentioned. *C. galapageia* was also collected by Habel acc. to Hemsl. in litt.

BURSERACEAE.

BURSERA, L.

B. GRAVEOLENS, Trian. & Planch. Ann. Sci. Nat. ser. 5, xiv. 303 (1872); Engl. in DC. Monogr. iv. 49. *Elaphrium graveolens*, HBK. Nov. Gen. & Sp. vii. 31 (1825). *E. Tacamaco*, Tul. Ann. Sci. Nat. ser. 3, vi. 368 (1846). *Spondias Edmonstonei*, Hook. f. (3), 230; Anderss. (1), 243, & (2), 106; Rob. & Greenm. (1), 145. *Guaiacum*, Baur, Am. Nat. XXV. 220. — GALAPAGOS IDS.: *Goodridge* (hb. Gr.); *Habel*. ABINGDON ISL.: common, large, extending from the beach to 350 m. alt., *Snodgrass & Heller*, no. 809a (hb. Gr.). ALBEMARLE ISL.: *Macrae*; southern part, *Baur*, no. 58 (hb. Gr.); Elizabeth Bay, abundant on the north shore, *Snodgrass & Heller*, no. 259 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 21 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, no. 227 (hb. Gr.). BARRINGTON ISL.: small and leafless, 28 May, acc. to Mr. Heller. CHARLES ISL.: *Edmonston*, acc. to Hook. f., l. c. CHATHAM ISL.: rather common, acc. to Mr. Heller. HOOD ISL.: scattered and rather small, acc. to Mr. Heller. INDEFATIGABLE ISL.: *Steindachner* in hb. Vienna Mus., acc. to Engl. l. c.; common on the north coast, acc. to Mr. Heller. JAMES

Isl.: James Bay, abundant, acc. to Mr. Heller. Narborough Isl.: southern part, common, *Snodgrass & Heller*, no. 340 (hb. Gr.). Tower Isl.: common, 3 to 5 m. high, acc. to Mr. Heller. Further distrib. Peru to U. S. Colombia, Mex., W. Ind. This is the Palo Santo of the Galapagos Islands.

B. malacophylla, nov. sp. *B. graveolenti* affinis; ramis crassis lignosis fistulosis a cortice griseo-brunneo tectis apice foliosis; foliis 7–9-foliolatis ubique molliter tomentosis, petiolo gracili 2–3 cm. longo, rachide alato 4–5 cm. longo, aliis inter jugis inferioribus paulo dilatatis sub jugo supremo in auriculis rotundatis ampliatis, foliolis ovato-oblongis crenatis 2–3 cm. longis basi obliquis apice rotundatis; pedunculis fructiferis 3 vel pluribus 9 cm. longis simplicibus vel paulo ramosis; capsulis ovoideis compressis glabris 1.2 cm. longis 8 mm. latis. — Seymour Isl.: south, abundant, May, 1899, *Snodgrass & Heller*, no. 596 (hb. Gr.). Endemic. Plate 1, fig. 2. A Palo Santo of North Seymour Isl., entered in Mr. Heller's field notes as differing in foliage from the Palo Santo of the other islands, was probably this, although the only specimens received are labelled South Seymour.

POLYGALACEAE.

Polygala, L.

P. Anderssonii. *P. puberula*, Anderss. (1), 232, & (2), 100; Rob. & Greenm. (1), 145; not Gray. — Indefatigable Isl.: in dry places on the sides of the mountain, *Andersson;* south of Conway Bay, *Baur*, no. 13 (hb. Gr.). Endemic. This species is omitted from Professor Chodat's monograph. It is reduced by Mr. Bennett, Jour. Bot. xvii. 204, but as I think erroneously, to *P. galapageia.* It is noteworthy that both species occur upon the same island but no intergradation has been observed in the matter of pubescence.

P. galapageia, Hook. f. (3), 233; Bennett, Jour. Bot. xvii. 204; Rob. & Greenm. (1), 145. *P. galapageja*, Anderss. (1), 232, & (2), 100, t. 10, f. 1. *P. galopagensis*, Chodat, Monogr. Polyg. 230 (1893). *P. chathamensis*, Anderss. (1), 232, & (2), 99, t. 10, f. 3. *P. insularis*, Rob. & Greenm. (1), 145, in part. — Galapagos Ids.: *Habel.* Abingdon Isl.: *Snodgrass & Heller*, no. 844 (hb. Gr.). Albemarle Isl.: *Macrae;* eastern part, Cowley Bay, *Baur*, no. 12 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 142, 177 (both in hb. Gr.). Bindloe Isl.: *Baur*, no. 10 (hb. Gr.); *Snodgrass & Heller*, no. 763 (hb. Gr.). Charles Isl.: *Darwin; Andersson* (hb. Gr.); *Baur*, no. 11 (hb. Gr.).

Chatham Isl.: *Andersson;* southwest end, lower region, *Baur*, no. 9 (hb. Gr.); northern part, *Baur*, no. 7 (hb. Gr.); *Snodgrass & Heller*, no. 494 (hb. Gr.). Indefatigable Isl.: Conway Bay, *Baur*, no. 4 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 668 (hb. Gr.). Jervis Isl.: *Baur*, no. 6 (hb. Gr.). Endemic.

Var. **insularis**. P. obovata, Hook. f. (3), 233; Anderss. (1), 231, & (2), 99, t. 10, f. 2; Rob. & Greenm. (1), 146; not St. Hil. *P. insularis*, Bennett, Jour. Bot. xvii. 204 (1879); Rob. & Greenm. (1), 146, in part. — Foliis latioribus, obovato-oblanceolatis vel obovatis, crassioribus; floribus minoribus, racemis brevibus. — Galapagos Ids.: *Cuming*, no. 103, acc. to Bennett, l. c.; *Mr. Brace* (hb. Gr.). Albemarle Isl.: *Macrae*, acc. to Bennett, l. c. Charles Isl.: *Edmonston; Andersson; Baur*. Chatham Isl.: *Darwin; Andersson* (hb. Gr.). Jervis Isl.: *Baur*, no. 8 (hb. Gr.). Endemic. None of the distinctions between this and *P. galapageia*, given by Bennett, hold in the series of specimens now at hand. Andersson names two foliar forms (*latifolia* and *angustifolia*).

EUPHORBIACEAE.

Acalypha, L.[1]

A. Adamsii, nov. sp.; perennis; caule tenui plus minusve repente copiose ramoso fusco griseo-tomentuloso; indumento e pilis brevibus albidis recurvatis sed in apice caulis plus minusve longioribus et flavescentibus composito; foliis late ovatis vel suborbicularibus crenatis

[1] With the material now at hand it is impossible to accept the treatment of *Acalypha* given by Mueller Argovensis, who reduces all Galapageian forms to varieties of one polymorphous species. We have here to do not only with annuals and perennials, with erect and prostrate habit, and with leaves of very different size, covered with pubescence varying from velvety and non-glandular to hirsute or glandular, but accompanying these considerable differences are others in the inflorescence sufficiently striking and constant to be classed as specific distinctions. The following key will suggest the leading diagnostic features.

Synopsis of the Galapageian Acalyphas.

* Involucre of the ♀ flowers 3-parted.

1. A. flaccida, Hook. f.

** Involucre irregularly 9-toothed: leaves large, 4 to 6 cm. long: floriferous part of the ♂ inflorescence 5 cm. in length, the peduncles very short.

2. A. Baurii, Rob. & Greenm.

*** Involucre irregularly 7–9-toothed: leaves rarely over 3 cm. in length: floriferous part of ♂ inflorescence 1 mm. to 2 cm. long, commonly equalled

obtusis vel rotundatis 6–20 mm. longis 5–14 mm. latis supra adpresse pilosis subtus sordide pubescentibus et minute albo-punctatis a basi rotundato nec cordato 5-nerviis petiolo 6–19 mm. longo tomentuloso; spicis brevibus axillaribus parte mascula perbrevi 1–3 mm. longa in pedunculo filiforme 6–9 mm. longo terminali; involucris foemineis 1–3 in basi pedunculi sessilibus 3-floris ad mediam partem 7-partitis; dentibus

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and often much exceeded by the peduncle which often bears below 1 to 3 or more ♀ involucres.

+ Leaves tomentose.

++ Indumentum of the stem non-glandular.

= Terminal (chiefly ♀) spike well developed.

3. A. SERICEA, Anderss.

= = Pistillate involucres scattered chiefly at or near the base of lateral spikes: no well developed terminal spike.

4. A VELUTINA, Hook. f.

++ ++ Indumentum of the stem glandular.

5. A. STROBILIFERA, Hook. f.

+ + Leaves puberulent or pubescent.

++ Terminal spike developed.

= Involucres glandular-pubescent.

6. A. RENIFORMIS, Hook. f.

= = Involucres hirsute with long non-glandular as well as shorter glandular hairs.

7. A. SPICATA, Anderss.

++ ++ No terminal spike.

= Prostrate perennials branching from the base.

a. Pistillate involucres 1 to 3, sessile at the very base of the rachis.

1. Leaves about equalling the petioles, cordate, reniform.

8. A. DIFFUSA, Anderss.

2. Leaves about equalling the petioles, suborbicular, rounded at the base, obtuse or rounded at the apex.

9. A. ADAMSII, Robinson.

3. Leaves considerably shorter than the petioles, acutish.

10. A. ALBEMARLENSIS, Robinson.

b. Pistillate involucres borne somewhat above the base of the rachis.

11. A. PARVULA, Hook. f.

= = Erect annuals.

a. Leaves cordate, 8 to 12 mm. long, obtuse or rounded: stem hirsute and glandular.

12. A. CORDIFOLIA, Hook. f.

b. Leaves 2 to 4 cm. long, rhombic-ovate, subacute, somewhat narrowed to a scarcely or not at all cordate base; stem glandular-puberulent.

13. A. CHATHAMENSIS, Robinson.

oblongis obtusiusculis pubescentibus. — *A. parvula*, var. *procumbens*, Rob. & Greenm. (1), 148, in part. — CHATHAM ISL.: southwest end, middle region, June, 1891, *Dr. George Baur*, no. 282 (hb. Gr.). Dedicated to the late C. F. Adams of the University of Illinois, the companion and efficient assistant of Dr. Baur upon his voyage to the Galapagos Islands. Endemic.

A. albemarlensis, nov. sp., gracilis sed basi ramoso lignescenti; ramis longis teretibus subsimplicibus purpurascentibus uno solo latere pubescentibus; indumento e pilis albidis brevissimis recurvatis et aliis longioribus rectis divergentibus composito; foliis parvis ovatis acutiusculis crenatis cordatis 7–10 mm. longis supra pilosis subtus pallidioribus creberrime punctatis et in nervis hirsutulis; petiolo filiforme flexuoso hirsutulo 9–17 mm. longo; spicis axillaribus parte mascula tenui gracili 6 mm. longa in pedunculo filiforme flexuoso 10–14 mm. longo; involucris foemineis in basi pedunculi saepius solitariis sessilibus glanduloso-pubescentibus 2–3-floris fere ad mediam partem 7-partitis; segmentis ovatis obtusiusculis. — ALBEMARLE ISL.: Tagus Cove, alt. 1220 m., 15 June, 1899, *Snodgrass & Heller*, no. 885 (hb. Gr.). Endemic.

A. BAURII, Rob. & Greenm. (1), 144, 148. — CHATHAM ISL.: southwest end, middle region, *Baur*, no. 285 (hb. Gr.). Endemic.

A. c̄hathamensis, nov. sp., annua erecta in parte superiori ramosa; caule tereti fuscescente dense glanduloso-tomentello; foliis ovatis tenuibus obtusiusculis basi rotundatis vel leviter angustatis grosse supra basi crenatis in pagina superiori sparse pubescentibus subtus pallidioribus sub lente squamosis in nervis pubescentibus 2.5–4 cm. longis 2–3 cm. latis; petiolo 2.5–3.5 cm. longo sordide glanduloso-piloso; spicis axillaribus ad 4–5 cm. longis; parte mascula terminali 2 mm. crassa 10–15 mm. longa supra densa infra laxiori; rachide filiforme glanduloso-puberulo involucros foemineos 1–5 glanduloso-pubescentes 2–3-floros ad mediam partem in dentes 6–7 inaequales deltoideos acutiusculos glanduloso-ciliatos sectos plus minusve supra basi gerente. — CHATHAM ISL.: May, 1899, *Snodgrass & Heller*, no. 541 (hb. Gr.), and (?) no. 540 (hb. Gr.). Endemic.

A. CORDIFOLIA, Hook. f. (3), 186; Anderss. (1), 238, & (2), 103. *A. parvula*, var. *cordifolia*, Muell. Arg. in DC. Prodr. xv. pt. 2, 877 (1862), but surely not Rob. & Greenm. (1), 148. — CHARLES ISL.: *Darwin*. CHATHAM ISL.: *Andersson* fide ipsi l. c., but identity doubted. Endemic.

A. DIFFUSA, Anderss. (1), 240, & (2), 104, t. 14, f. 4; Rose (1),

137. — Albemarle Isl.: in very sterile places, *Andersson* (hb. Gr.). Chatham Isl.: *A. Agassiz*, acc. to Rose, l. c. Endemic.

A. flaccida, Hook. f. (3), 186; Anderss. (1), 238, & (2), 103. *A. parvula*, var. *flaccida*, Muell. Arg. in DC. Prodr. xv. pt. 2, 878 (1862). — James Isl.: *Darwin*. Endemic.

A. parvula, Hook. f. (3), 185; Anderss. (1), 240, & (2), 104. *A. parvula*, var. *genuina*, Muell. Arg. l. c. 878 (1862); Rob. & Greenm. (1), 148. — Albemarle Isl.: *Macrae; Capt. King*, acc. to Muell. Arg. l. c.; Iguana Cove, *Snodgrass* & *Heller*, nos. 83 (hb. Gr.), 97 (hb. Gr.); Tagus Cove, not common, from beach to 1230 m. alt., *Snodgrass* & *Heller*, nos. 202 (hb. Gr.), 245? (hb. Gr.), 886 (hb. Gr.); southern portion, *Baur*, no. 281 (hb. Gr.). Endemic.

A. reniformis, Hook. f. (3), 187; Anderss. (1), 240, & (2), 104. *A. parvula*, var. *reniformis*, Muell. Arg. l. c. — Charles Isl.: *Darwin*. Endemic.

A. sericea, Anderss. (1), 238, & (2), 103, t. 14, f. 1. *A. parvula*, var. *pubescens*, Muell. Arg. l. c. 877, in part; Rob. & Greenm. (1), 148, in part. — Abingdon Isl.: *Snodgrass* & *Heller*, no. 842 (hb. Gr.). Albemarle Isl.: in stony places of lower region, *Andersson*. Bindloe Isl.: *Baur*, no. 277 (hb. Gr.); *Snodgrass* & *Heller*, no. 762 (hb. Gr.). Endemic. Ascribed to Chatham Isl. by Anderss. (1), 238, but apparently by clerical error, as Albemarle Isl. is substituted in his later work.

A. spicata, Anderss. (1), 239, (2), 104, t. 14, f. 3. *A. parvula*, var. *procumbens*, Muell. Arg. l. c. 878, in part. — Charles Isl.: *Baur*, no. 283 (hb. Gr.), identity doubtful. Chatham Isl.: in dry places of the lower region, *Andersson* (hb. Gr.). Duncan Isl.: *Baur*, no. 276 (hb. Gr.), identity doubtful. Gardner Isl.: *Snodgrass* & *Heller*, no. 637 (hb. Gr.), identity doubtful. Hood Isl.: *Snodgrass* & *Heller*, no. 723 (hb. Gr.), identity doubtful. Jervis Isl.: *Baur*, no. 279 (hb. Gr.). Endemic.

A. strobilifera, Hook. f. (3), 187; Anderss. (1), 238, & (2), 103. *A. parvula*, var. *strobilifera*, Muell. Arg. l. c. 877; Rob. & Greenm. (1), 148. — Albemarle Isl.: eastern portion, Cowley Bay, *Baur*, no. 273 (hb. Gr.). Chatham Isl.: *Darwin*; in dry places of middle region, *Andersson*; northern part, *Baur*, no. 272 (hb. Gr.). Endemic.

A. velutina, Hook. f. (3), 186; Anderss. (1), 237, & (2), 103, t. 14, f. 2. *A. parvula*, var. *pubescens*, Muell. Arg. l. c. 877, in part. —

CHARLES ISL.: *Darwin ;* in arid places of the middle region, *Andersson* (hb. Gr.). CHATHAM ISL.: *Wood*, acc. to Muell. Arg. Endemic.

Var. MINOR, Hook. f. (3), 187; Anderss. (1), 238, & (2), 103. *A. parvula*, var. *pubescens*, Muell. Arg. l. c. 877, in part; Rob. & Greenm. (1), 148, in part. — CHARLES ISL.: *Darwin ;* Cuevas Bay, *Baur*, no. 275 (hb. Gr.). Endemic.

A. sp. — *A. parvula*, var. *cordifolia?* Rob. & Greenm. (1), 148 (where by error referred to Jervis Isl.), not Muell. Arg. — BARRINGTON ISL.: *Baur*, no. 274 (hb. Gr.). Endemic.

A. sp. — BARRINGTON ISL.: *Snodgrass & Heller*, no. 472 (hb. Gr.). Endemic.

A. sp. — BARRINGTON ISL.: *Baur*, no. 280 (hb. Gr.). Endemic.

A. sp. — INDEFATIGABLE ISL.: south of Conway Bay, *Baur*, no. 278 (hb. Gr.). Endemic.

A. sp. — *A. parvula*, var. *flaccida*, Rob. & Greenm. (1), 148, not Muell. Arg. — DUNCAN ISL.: *Baur*, no. 284 (hb. Gr.).

CROTON, L.

C. SCOULERI, Hook. f. (3), 188; Anderss. (1), 242, & (2), 105; Rob. & Greenm. (1), 148. *C. Scouleri*, var. *genuinus*, Muell. Arg. in DC. Prodr. xv. pt. 2, 605 (1862) ? *C. flavens*, var., Caruel (1), 625. — GALAPAGOS IDS.: *Goodridge* (hb. Gr.); *Habel*. BARRINGTON ISL.: *Baur*, no. 265 (hb. Gr.). BINDLOE ISL.: *Snodgrass & Heller*, no. 785 (hb. Gr.), large-leaved form. CHARLES ISL.: *Snodgrass & Heller*, no. 453 (hb. Gr.), approaching var. *incanus*. CHATHAM ISL.: *Darwin ;* northern part, *Baur*, without number (hb. Gr.); *Chierchia?* HOOD ISL.: *Baur*, no. 264 (hb. Gr.). JAMES ISL.: *Scouler ; Douglas ; Andersson ;* James Bay, abundant on lava soil, small trees 2.5 to 4 m. high, *Snodgrass & Heller*, no. 386 (hb. Gr.). NARBOROUGH ISL.: southern part, *Snodgrass & Heller*, nos. 330 (hb. Gr.), 352 (hb. Gr.). TOWER ISL.: *Baur*, without number (hb. Gr.), broad-leaved form.

Var. ALBESCENS, Muell. Arg. l. c. *C. albescens*, Anderss. (1), 242, & (2), 105. *C. incanus*, Anderss. (1), 243, & (2), 106; Rob. & Greenm. (1), 148; not Kunth. — ALBEMARLE ISL.: *Andersson ;* mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 292 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 226 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 266 (hb. Gr.). CHARLES ISL.: *Andersson ; A. Agassiz* (hb. U. S. Nat. Mus.); *Baur*, no. 267 (hb. Gr.). JAMES ISL.: *Andersson* (hb. Gr.). Endemic.

Forma MICROPHYLLUS, Muell. Arg. l. c. *C. incanus*, var. *microphylla*, Anderss. (1), 243, & (2), 106. — ALBEMARLE ISL.: *Andersson.* Endemic.

Var. BREVIFOLIUS, Muell. Arg. l. c. *C. brevifolius*, Anderss. (1), 241, & (2), 105. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, no. 47 (hb. Gr.). CHARLES ISL.: *Andersson.* CULPEPPER ISL.: *Snodgrass* & *Heller*, no. 4 (hb. Gr.). DUNCAN ISL.: *Snodgrass* & *Heller*, no. 686 (hb. Gr.), passing to typical form. GARDNER ISL.: *Snodgrass* & *Heller*, no. 641 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass* & *Heller*, no. 572 (hb. Gr.). WENMAN ISL.: *Snodgrass* & *Heller*, no. 6 (hb. Gr.). Endemic.

Var. GRANDIFOLIUS, Muell. Arg. l. c. *C. xalapensis*, Hook. f. (3), 188; Anderss. (1), 241, & (2), 105; ? Rob. & Greenm. (1), 148; not HBK. — ABINGDON ISL.: *Snodgrass* & *Heller* no. 822 (hb. Gr.). CHARLES ISL.: *Lee* (hb. U. S. Nat. Mus., & hb. Gr.). CHATHAM ISL.: southwest end, upper region, *Baur*, no. 269 (hb. Gr.). JAMES ISL.: *Darwin.* TOWER ISL.: *Snodgrass* & *Heller*, no. 802 (hb. Gr.).

Var. MACRAEI, Muell. Arg. l. c. *C. Macraei*, Hook. f. (3), 188; Anderss. (1), 243, & (2), 106; Rob. & Greenm. (1), 148. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: *Macrae; King*, acc. to Muell. Arg. l. c.; eastern part, Cowley Bay, *Baur*, no. 270 (hb. Gr.); Tagus Cove, most abundant bush from beach to 1230 m. alt., *Snodgrass* & *Heller*, nos. 153 (hb. Gr.), 189 (hb. Gr.). JAMES ISL.: in woods, *Andersson;* Orchilla Bay, *Baur*, no. 271 (hb. Gr.). Endemic.

EUPHORBIA, L.

E. AMPLEXICAULIS, Hook. f. (3), 183; Anderss. (1), 235, & (2), 101; Boiss. in DC. Prodr. XV. pt. 2, 13; Rob. & Greenm. (1), 149. — GALAPAGOS IDS.: *Habel.* BINDLOE ISL.: *Snodgrass* & *Heller*, no 771 (hb. Gr.). CHATHAM ISL.: *Darwin.* SEYMOUR ISL.: south, *Snodgrass* & *Heller*, no. 582 (hb. Gr.). TOWER ISL.: *Baur*, no. 255 (hb. Gr.); *Snodgrass* & *Heller*, no. 795, (hb. Gr.). WENMAN ISL.: *Snodgrass* & *Heller*, no. 11 (hb. Gr.). Endemic.

E. APICULATA, Anderss. (1), 234, & (2), 101; Boiss. in DC. Prodr. XV. pt. 2, 17. — CHATHAM ISL.: near shore, *Andersson.* Endemic.

E. ARTICULATA, Anderss. (1), 236, & (2), 102, t. 12, f. 2; Boiss. l. c. 17; Rose (1), 137; Rob. & Greenm. (1), 148. — ABINGDON ISL.: *Snodgrass* & *Heller*, no. 834 (hb. Gr.). ALBEMARLE ISL.: eastern part, Cowley Bay, *Baur*, no. 258 (hb. Gr.). Elizabeth Bay,

Snodgrass & *Heller*, no. 276 (hb. Gr.); Tagus Cove, common near beach and up to 185 m. alt., *Snodgrass* & *Heller*, nos. 149 (hb. Gr.), 181 (hb. Gr.). Bindloe Isl.: *Baur*, no. 257 (hb. Gr.). Charles Isl.: Cormorant Bay, *Baur*, no. 259 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); *A. Agassiz*, acc. to Rose, l. c. Indefatigable Isl.: *Andersson*. James Isl.: Orchilla Bay, *Baur*, no. 260 (hb. Gr.). Seymour Isl.: south, *Snodgrass* & *Heller*, no. 585 (hb. Gr.). Endemic.

E. diffusa, Hook. f. (3), 184; Anderss. (1), 234, & (2), 101; Boiss. in DC. Prodr. xv. pt. 2, 17; Rob. & Greenm. (1), 148. — Galapagos Ids.: *Habel*. Albemarle Isl.: *Cuming; Macrae; Andersson*. Indefatigable Isl.: northern part, *Snodgrass* & *Heller*, no. 650 (hb. Gr.). Jervis Isl.: *Baur*, no. 243 (hb. Gr.). Endemic.

E. flabellaris, Anderss. acc. to Boiss. in DC. Prodr. xv. pt. 2, 17 (1862); Rob. & Greenm. (1), 148. *E. maculata*, Hook. f. (3), 182; Anderss. (1), 233, & (2), 101; not L. — Abingdon Isl.: *Snodgrass* & *Heller*, no. 829 (hb. Gr.). Barrington Isl.: *Snodgrass* & *Heller*, no. 485 (hb. Gr.), identity doubtful. Charles Isl.: *Darwin*. Gardner Isl.: *Snodgrass* & *Heller*, no. 631 (hb. Gr.). Indefatigable Isl.: *Andersson;* south of Conway Bay, *Baur*, no. 256 (hb. Gr.). James Isl.: James Bay, common on lava rocks near sand beach, *Snodgrass* & *Heller*, no. 383 (hb. Gr.), identity doubtful. Seymour Isl.: north, *Snodgrass* & *Heller*, no. 562 (hb. Gr.). Tower Isl.: *Snodgrass* & *Heller*, no. 796 (hb. Gr.). Endemic.

E. galapageia, Rob. & Greenm. (1), 144, 148. — Charles Isl.: *Baur*, no. 261 (hb. Gr.). Endemic.

E. nesiotica, nov. sp., verisimiliter annua gracilis glaberrima glaucescens; caulibus pluribus flexuosis dichotomis procumbentibus teretibus laevibus; foliis oppositis oblongis plus minusve denticulatis glabris obsolete venulosis apice rotundatis basi obliquis obtusis breviter petiolatis quam internodia valde brevioribus patentibus; involucris axillaribus breviter pedunculatis ad nodos superiores solitariis vel oppositis minimis turbinatis; lobis lanceolato-deltoideis plus minusve ciliatis; glandulis quatuor sessilibus transverse oblongis atroviolaceis; capsula nutante crassiore quam longa straminea-brunnea glabra laeve; coccis obtuse carinatis; stylis brevibus ad partem mediam bifidis. — Seymour Isl.: south, May, 1899, *Snodgrass* & *Heller*, no. 589 (hb. Gr.). Endemic. Leaves 7 mm. long, half as broad; involucre 1 mm. long, capsule 1.4 mm. long, 2 mm. thick. Plate 2, fig. 5.

E. NUMMULARIA, Hook. f. (3), 183; Anderss. (1), 235, & (2), 101, t. 12, f. 1; Boiss. in DC. Prodr. xv. pt. 2, 16, & Icon. Euphorb. t. 5; Rose (1), 137; Rob. & Greenm. (1), 148. — CHATHAM ISL.: *Darwin;* covering large volcanic rocks near the shore, *Andersson* (hb. Gr.); *A. Agassiz;* southwest end, lower region, *Baur*, no. 253 (hb. Gr.); northern part, *Baur*, no. 254 (hb. Gr.); *Snodgrass & Heller*, no. 493 (hb. Gr.). Endemic.

Var. GLABRA, Rob. & Greenm. (1), 144, 148. — CHARLES ISL.: Cuevas Bay, *Baur*, no. 386 (hb. Gr.). Endemic.

E. PILULIFERA, L. Amoen. Acad. iii. 115 (1756); Hook. f. (3), 182; Anderss. (1), 233, & (2), 100; Boiss. in DC. Prodr. xv. pt. 2, 21. — CHARLES ISL.: cultivated ground, middle region, *Andersson; Lee* (hb. U. S. Nat. Mus.); *Snodgrass & Heller*, no. 439 (hb. Gr.). CHATHAM ISL.: *Snodgrass & Heller*, no. 519 (hb. Gr.). JAMES ISL.: *Darwin.* Distrib. general in warm countries.

E. PUNCTULATA, Anderss. (1), 235, & (2), 102; Boiss. l. c. 17; Rob. &. Greenm. (1), 148. — ALBEMARLE ISL.: in very dry places, *Andersson.* DUNCAN ISL.: *Baur*, no. 262 (hb. Gr.). HOOD ISL.: *Baur*, no. 263 (hb. Gr.). Endemic.

E. RECURVA, Hook. f. (3), 182; Anderss. (1), 234, & (2), 101; Boiss. in DC. Prodr. xv. pt. 2, 16. — CHATHAM ISL.: *Darwin;* in lower stony region, *Andersson* (hb. Gr.). Endemic.

E. VIMINEA, Hook. f. (3), 184; Anderss. (1), 235, & (2), 101, t. 12, f. 3; Boiss. in DC. Prodr. xv. pt. 2, 17; Rob. & Greenm. (1), 136, 138, 148. *E. viminea*, forma *albemarlensis* (typica), Rob. & Greenm. (1), 138. — ALBEMARLE ISL.: *Macrae;* eastern part, Cowley Bay, *Baur*, no. 252 (hb. Gr.); southern portion, *Baur*, no. 251 (hb. Gr.); Elizabeth Bay, *Snodgrass & Heller*, no. 277 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 164 (hb. Gr.). Endemic.

Forma BARRINGTONENSIS, Rob. & Greenm. (1), 139. — BARRINGTON ISL.: *Baur*, no. 244 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 248 (hb. Gr.); *Snodgrass & Heller*, no. 761 (hb. Gr.). Endemic.

Forma CAROLENSIS, Rob. & Greenm. (1), 139. — CHARLES ISL.: *Andersson* (hb. Gr.). Endemic.

Forma CASTELLANA, Rob. & Greenm. (1), 138. — TOWER ISL.: *Baur*, no. 247 (hb. Gr.); *Snodgrass & Heller*, no. 805 (hb. Gr.). Endemic.

Forma CHATHAMENSIS, Rob. & Greenm. (1), 138. — CHATHAM ISL.: *Andersson; Baur*, no. 245 (hb. Gr.). Endemic.

Forma JACOBENSIS, Rob. & Greenm. (1), 138. — JAMES ISL.: Orchilla Bay, *Baur*, no. 249 (hb. Gr.). Endemic.

Forma JERVENSIS, Rob. & Greenm. (1), 139. — JERVIS ISL.: *Baur*, no. 250 (hb. Gr.). Endemic.

Var. ABINGDONENSIS, Rob. & Greenm. (1), 139. — ABINGDON ISL.: *Baur*, no. 246 (hb. Gr.). Endemic.

For a discussion of these forms see Rob. & Greenm. (1), 138, 139. *E. riminea* was collected on the Galapagos Ids. also by *Habel*.

E. sp. aff. *E. articulata*, Anderss. — BINDLOE ISL.: *Snodgrass & Heller*, no. 780 (hb. Gr.), sterile. Leaves narrowly ovate-oblong from a cordate base, otherwise much like *E. articulata*, which in its typical form grows upon the same island.

E. sp. Anderss. (1), 237, & (2), 102. — CHATHAM ISL.: *Andersson*.

E. sp. Hook. f. (3), 185; Anderss. (1), 237, & (2), 102. — CHARLES ISL.: *Darwin*.

HIPPOMANE, L.

H. MANCINELLA, L. Sp. 1191 (1753); Anderss. (1), 237, & (2), 103. — GALAPAGOS IDS.: *Habel*. ALBEMARLE ISL.: Elizabeth Bay, *Snodgrass & Heller*, no. 279 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 49 (hb. Gr.). CHATHAM ISL.: *Andersson*. Further distrib. S. United States, Mex., W. Ind., Northwestern S. Am.

MANIHOT, Adans.

M. UTILISSIMA, Pohl. Pl. Bras. Ic. i. 32, t. 24 (1827); Muell. Arg. in DC. Prodr. XV. pt. 2, 1064; Caruel (1), 625. — CHATHAM ISL.: *Chierchia*. Widely distrib. in tropical countries.

PHYLLANTHUS, L.

P. CAROLINENSIS, Walt. Fl. Car. 228, as *caroliniensis* (1788); Caruel (1), 625; Rob. & Greenm. (1), 148. *P. obovatus*, Muhl. ex Willd. Sp. iv. 574 (1805); Hook. f. (3), 185; Anderss. (1), 237, & (2), 103. — ALBEMARLE ISL.: *Andersson*; Iguana Cove, *Snodgrass & Heller*, no. 106 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 194 (hb. Gr.). CHARLES ISL.: *Darwin*; *Andersson* (hb. Gr.). CHATHAM ISL.: *Chierchia*; southwest end, middle region, *Baur*, no. 268 (hb. Gr.). JAMES ISL.: James Bay, common on lava rocks, *Snodgrass & Heller*, no. 385 (hb. Gr.). NARBOROUGH ISL.: northern part, *Snodgrass &*

Heller, no. 296 (hb. Gr.) ; southern part, *Snodgrass & Heller*, no. 332 (hb. Gr.). Further distrib. northern S. Am., Mex., W. Ind., southern and central U. S.

Ricinus, L.

R. communis, L. Sp. 1007 (1753) ; Anderss. (1) 241, & (2), 105. — Charles Isl. : in cultivated ground, *Andersson*. Widely distrib. in warm countries.

CALLITRICHACEAE.

Callitriche, L.

C. sp. Wolf, (1), 284. — Charles Isl. : in brook near hacienda acc. to Wolf. l. c.

CELASTRACEAE.

Maytenus, Feuill.

M. obovata, Hook. f. (3), 230 ; Anderss. (1), 233, & (2), 100 ; Rob. & Greenm. (1), 145. — Albemarle Isl. : southern part, *Baur*, no. 49 (hb. Gr.) ; Elizabeth Bay, on lava fields near beach, *Snodgrass & Heller*, no. 936 (hb. Gr.) ; Iguana Cove, *Snodgrass & Heller*, no. 66 (hb. Gr.) ; Tagus Cove, *Snodgrass & Heller*, nos. 158 (hb. Gr.), 877 (hb. Gr.). Barrington Isl. : *Baur*, no. 52 (hb. Gr.). Charles Isl. : *Andersson ; Baur*. Chatham Isl. : *Darwin ;* in woods of lower region, *Andersson ;* southwest end, middle region, *Baur*, no. 48½ (hb. Gr.). Duncan Isl. : *Snodgrass & Heller*, no. 685 (hb. Gr.). Hood Isl. : *Baur*, no. 51 (hb. Gr.). James Isl. : James Bay, scattered along the sandy beach, *Snodgrass & Heller*, no. 371 (hb. Gr.). Jervis Isl. : *Baur*. Narborough Isl. : common acc. to field notes of Mr. Heller. Seymour Isl. : south, *Snodgrass & Heller*, no. 597 (hb. Gr.). Endemic.

SAPINDACEAE.

Cardiospermum, L.

C. Corindum, L. Sp. ed. 2, 526 (1762) ; Radlk. Sitzungsb. Kgl. Bayer. Akad. 1878, p. 261 ; Rob. & Greenm. (1), 145, in part (as to pl. Chatham). *C. molle*, HBK. Nov. Gen. & Sp. v. 103 (1821) ; Hook. f. (3), 231 ; Anderss. (1), 231, & (2), 99 ; Caruel (1), 623. — Albemarle Isl. : *Andersson ;* mountain north of Elizabeth Bay, *Snod-*

grass & Heller, no. 281 (hb. Gr.). CHARLES ISL.: *Andersson.* CHATHAM ISL.: *Darwin; Andersson* (hb. Gr.); *Chierchia;* southwest end, lower region, *Baur*, no. 60 (hb. Gr.); southwest end, upper region, *Baur*, no. 59 (hb. Gr.); *Snodgrass & Heller*, no. 512 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson.* JAMES ISL.: *Andersson;* common about James Bay, *Snodgrass & Heller*, no. 359 (hb. Gr.). WENMAN ISL.: *Snodgrass & Heller*, no. 8 (hb. Gr.). Further distrib. trop. S. Am., Mex., southwestern U. S.

C. GALAPAGEIUM, Rob. & Greenm. Proc. Am. Acad. xxxii. 38 (1896). *C. Corindum*, Rob. & Greenm. (1), 145, in part (as to pl. Albemarle), not L. — ALBEMARLE ISL.: southern part, *Baur*, no. 61 (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass & Heller*, no. 675 (hb. Gr.). Endemic.

DODONAEA, L.

D. VISCOSA, Jacq. Enum. Pl. Carib. 19 (1762); L. Mant. ii. 228; Rob. & Greenm. (1), 145. Forma typica. — ALBEMARLE ISL.: eastern part, Cowley Bay, *Baur*, no. 62 (hb. Gr.); southern part, *Baur*, no. 63 (hb. Gr.). Further distrib. general in warm countries.

Var. SPATHULATA, Benth. Fl. Aust. i. 476 (1863). — ALBEMARLE ISL.: Tagus Cove, *Snodgrass & Heller*, nos. 876 (hb. Gr.), 904 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, no. 244 (hb. Gr.). Specimen imperfect and doubtful, but clearly representing a very different form of the species from those collected on the same island by *Baur*. Further distrib. general in warm countries.

SAPINDUS, L.

S. SAPONARIA, L. Sp. 367 (1753); Sarg. Silv. ii. 69, t. 74, 75. "*S.* near *S. acuminatus*, Willd." Rob. & Greenm. (1), 145. — ALBEMARLE ISL.: southern part, *Baur*, no. 57 (hb. Gr.). Form with leaflets glabrous beneath. Further distrib. of species trop. Am., Mex., W. Ind., southeastern U. S.

RHAMNACEAE.

DISCARIA, Hook.

D. PAUCIFLORA, Hook. f. (3), 229; Anderss. (1), 233, & (2), 100; Rob. & Greenm. (1), 145. *D.* sp. Rob. & Greenm. (1), 145. — ALBEMARLE ISL.: *Darwin; Baur;* common about Elizabeth Bay, acc. to Mr. Heller; forming dense thickets, Tagus Cove, *Snodgrass & Heller*, no. 143 (hb. Gr.). BARRINGTON ISL.: *Baur*, no. 55 (hb. Gr.); abundant,

Snodgrass & Heller, no. 478 (hb. Gr.). CHARLES ISL.: from this island Professor Caruel (1), 624, reports a spiny shrub collected by Chierchia and supposed to belong to the *Rhamnaceae*. It may well have been this species. CHATHAM ISL.: woods near shore, *Andersson;* southwest end, lower region, *Baur*. DUNCAN ISL.; not common, acc. to Mr. Heller. HOOD ISL.: *Baur*, (hb. Gr.), juvenile form with serrate leaves. INDEFATIGABLE ISL.: north coast, acc. to Mr. Heller. JAMES ISL.: James Bay, near beach in sand, acc. to Mr. Heller. SEYMOUR ISL.: north, uncommon, acc. to Mr. Heller; south, abundant, *Snodgrass & Heller*, no. 608 (hb. Gr.). Further distrib. collected by Dr. Baur at Posorja on the Gulf of Guayaquil, Ecuador, where perhaps introduced from the islands.

VITACEAE.

CISSUS, L.

C. SICYOIDES, L. Syst. Nat. ed. 10, 897 (1760). *Vitis sicyoides*, Miq. Ann. Mus. Bot. Lugd. Bat. i. 83 (1863–1864). — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 26, 45, 89, 101 (all in hb. Gr.). BINDLOE ISL.: common near the shore, acc. to field notes of Mr. Heller. CHARLES ISL.: *Lee* (hb. U. S. Nat. Mus.). NARBOROUGH ISL.: bordering beaches, acc. to Mr. Heller. Further distrib. Mex., W. Ind., S. Am., southward to Paraguay.

VITIS, L.

V. VINIFERA, L. Sp. 202 (1753); Caruel (1), 623. — CHARLES ISL.: in sterile state, *Chierchia* acc. to Caruel. Probably introduced through cultivation. Further distrib. Old World.

TILIACEAE.

CORCHORUS, L.

C. PILOBOLUS, Link, Enum. Hort. Berol. ii. 72 (1822); Jacq. Ecl. t. 163 as *C. bullatus*. — GALAPAGOS IDS.: *Habel?* ALBEMARLE ISL.: *Snodgrass & Heller*, no. 90. GARDNER ISL.: *Snodgrass & Heller*, no. 645 (hb. Gr.). Further distrib. trop. S. Am., W. Ind., Mex.

TRIUMFETTA, L.

T. SEMITRILOBA, Jacq. Enum. Pl. Carib. 22 (1762), Stirp. Am. 147, & Hort. Vindob. iii. t. 16. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 69, 70, 107, 858, 859 (all in hb. Gr.). Further distrib. general in trop. and subtrop. Am.

MALVACEAE.

Abutilon, Gaertn.

A. Anderssonianum, Garcke in Anderss. (1), 230, & (2), 98, t. 15, f. 1. — Abingdon Isl.: *Snodgrass & Heller*, no. 847 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 479 (hb. Gr.). Bindloe Isl.: *Snodgrass & Heller*, no. 788 (hb. Gr.). Charles Isl.: dry places, lower region, *Andersson*. Chatham Isl.: dry places, lower region, *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 507 (hb. Gr.). Duncan Isl.: *Snodgrass & Heller*, no. 702 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 632 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 662 (hb. Gr.). Tower Isl.: *Snodgrass & Heller*, no. 794 (hb. Gr.). Endemic. The forms on Duncan and Gardner Ids. are smoother and greener than the others.

A. depauperatum, Anderss. (1), 230, & (2), 98. *A. Anderssonianum*, Rob. & Greenm. (1), 145, not Garcke. *Sida depauperata*, Hook. f. (3), 232. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 76, 82 (both in hb. Gr.). Barrington Isl.: *Baur*, no. 16 (hb. Gr.), determined from character. Charles Isl.: *Darwin*. Endemic. Perhaps only a dry soil form of *A. Anderssonianum*.

Anoda, Cav.

A. hastata, Cav. Diss. i. 38, t. 11, f. 2 (1790). *A. acerifolia*, DC. Prodr. i. 459 (1824); Rob. & Greenm. (1), 145, where by error ascribed to Chatham Island. — Charles Isl.: *Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 20 (hb. Gr.); *Snodgrass & Heller*, no. 449 (hb. Gr.). Further distrib. southern U. S., Mex. to Chili.

Bastardia, HBK.

B. viscosa, HBK. Nov. Gen. & Sp. v. 256 (1821); L'Her. Stirp. t. 53 bis; E. G. Baker, Jour. Bot. xxxi. 68. *B. guayaquilensis*, Turcz. Bull. Soc. Nat. Mosc. 1858, p. 201. *Sida viscosa*, L. Syst. ed. 10, 1145 (1760). — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 105 (hb. Gr.). Chatham Isl.: *Snodgrass & Heller*, no. 533 (hb. Gr.). Further distrib. western S. Am., Mex., W. Ind.

Gossypium, L.

G. barbadense, L. Sp. 693 (1753). *G. purpurascens*, Hook. f. (3), 231; Anderss. (1), 228, & (2), 97; Rose (1), 136; not Poir.

G. Klotzschianum, Rob. & Greenm. (1), 145, not Anderss. — Galapagos Ids.: *Habel.* Abingdon Isl.: *Snodgrass & Heller*, no. 828 (hb. Gr.); Albemarle Isl.: *Baur;* Iguana Cove, *Snodgrass & Heller*, nos. 46 (hb. Gr.), 854 (hb. Gr.). Barrington Isl.: *Baur*, no. 24 (hb. Gr.). Charles Isl.: *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 402 (hb. Gr.). Chatham Isl.: *Darwin;* southwest end lower region, *Baur*, no. 22 (hb. Gr.); northern part, *Baur*, no. 25 (hb. Gr.). Duncan Isl.: *A. Agassiz.* Gardner Isl.: *Snodgrass & Heller*, no. 633 (hb. Gr.). Hood Isl.: *Baur*, no. 21 (hb. Gr.); *Snodgrass & Heller*, no. 752 (hb. Gr.). James Isl.: *Darwin.* Seymour Isl.: south, *Snodgrass & Heller*, no. 599 (hb. Gr.). Further distrib. general in tropics.

G. Klotzschianum, Anderss. (1), 228, & (2), 97. — Galapagos Ids.: *Edmonston* (hb. Gr.). Albemarle Isl.: *Andersson.* Bindloe Isl.: *Snodgrass & Heller*, no. 772 (hb. Gr.). Charles Isl.: *Andersson* (l. c., but his spec. so labelled in hb. Gr. is clearly *G. barbadense*). Chatham Isl.: *Andersson.* Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 656 (hb. Gr.). Endemic. *Andersson* (2), 97, states that this species was collected upon Chatham and James Islands by Darwin, but this appears to have been a clerical error and to refer to the preceding species.

Hibiscus, L.

I. tiliaceus, L. Sp. 694 (1753). *Paritium tiliaceum*, Hook. f. (4), 262; Anderss. (1), 229, & (2), 98. — Charles Isl.: *Edmonston.* Further distrib. general in tropics.

Malachra, L.

M. capitata, L. Syst. ed. 12, 458 (1767); Hook. f. (3), 231; Anderss. (1), 229, & (2), 98; Gürcke in Engl. Bot. Jahrb. xvi. 348. — James Isl.: *Darwin* acc. to Hook. f., l. c. Further distrib. trop. S. Am., W. Ind., Mex., sparingly introd. in trop. of Old World.

Sida, L.

S. acuta, Burm., var. carpinifolia, K. Schum. in Mart. Fl. Bras. xii. pt. 3, 326 (1891); E. G. Baker, Jour. Bot. xxx. 238. *S. carpinifolia*, L. f. Suppl. 307 (1781); Anderss. (1), 229, & (2), 98, excl. synon. — Charles Isl.: dry places of middle region, *Andersson.* Further distrib. general in trop. and subtrop. regions.

S. ANGUSTIFOLIA, Lam. Dict. i. 4 (1783). *S. tenuicaulis*, Hook. f. (3), 232, acc. to E. G. Baker. *S. spinosa* & *S. tenuicaulis*, Anderss. (1), 229, & (2), 98. *S. spinosa*, var. *angustifolia*, Griseb. Fl. Brit. W. Ind. 74 (1859); E. G. Baker, Jour. Bot. xxx. 237. *S. rhombifolia*, Rob. & Greenm. (1), 145, in part (as to pl. Charles and pl. Indefatigable). — ALBEMARLE ISL.: *Lee* (hb. U. S. Nat. Mus.); Iguana Cove, *Snodgrass & Heller*, nos. 84 (hb. Gr.), 104 (hb. Gr.). CHARLES ISL.: *Andersson; Baur*, no. 17 (hb. Gr.); *Snodgrass & Heller*, no. 438 (hb. Gr.). CHATHAM ISL.: lower region, *Andersson* (hb. Gr.). DUNCAN ISL.: *Snodgrass & Heller*, no. 701 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 629 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson;* south of Conway Bay, *Baur*, no. 18 (hb. Gr.). JAMES ISL: *Darwin; Andersson.* NARBOROUGH ISL.: northern part, *Snodgrass &, Heller*, no. 298 (hb. Gr.). Further distrib. general in warm countries.

S. CORDIFOLIA, L. Sp. 684 (1753); K. Schum. in Mart. Fl. Bras. xii. pt. 3, 331, t. 62. — ALBEMARLE ISL.: Iguana Cove, below 310 m. alt., *Snodgrass & Heller*, no. 860 (hb. Gr.). Sterile. Further distrib. general in trop. and subtrop. regions.

S. PANICULATA, L. Syst. ed. 10, 1145 (1760); Rob. & Greenm. (1), 145; E. G. Baker, Jour. Bot. xxx. 294. *S. atrosanguinea*, Jacq. Ic. Rar. t. 136. *S. floribunda*, HBK. Nov. Gen. & Sp. v. 258, t. 473 (1821). — GALAPAGOS IDS.: *Habel* acc. to Hemsl. in litt. ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 71 (hb. Gr.), 86 (hb. Gr.). CHARLES ISL.: *Baur*, no. 19 (hb. Gr.); *Snodgrass & Heller*, no. 401 (hb. Gr.). Further distrib. trop. S. Am., W. Ind., Mex.

S. RHOMBIFOLIA, L. Sp. 684 (1753); Hook. f. (4), 262; Anderss. (1), 229, & (2), 98; Rob. & Greenm. (1), 145, in part (as to pl. Chatham); E. G. Baker, Jour. Bot. xxx. 239, q. v. for synon. — CHARLES ISL.: *Edmonston; Lee* (hb. U. S. Nat. Mus.); *Snodgrass & Heller*, no. 448 (hb. Gr.). CHATHAM ISL.: stony places, lower region, *Andersson;* southwest end, middle region, *Baur*, no. 15 (hb. Gr.); *Snodgrass & Heller*, no. 532 (hb. Gr.). Further distrib. general in warm countries.

S. SPINOSA, L. Sp. 683 (1753); Gray, Syn. Fl. i. pt. 1, 324. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: common on tufa soil, Tagus Cove, *Snodgrass & Heller*, no. 206 (hb. Gr.). Further distrib. general in warm countries. In distinguishing this species and *S. angustifolia*, I have followed Dr. Gray's treatment and distinctions.

S. VERONICAEFOLIA, Lam., var. HUMILIS, K. Schum. in Mart. Fl. Bras. xii. pt. 3, 320 (1891), q. v. for extensive synon.; E. G. Baker, Jour. Bot. XXX. 293. *S. humilis*, Cav. Diss. v. 277, t. 134, f. 2 (1788). — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 85 (hb. Gr.). Further distrib. general in tropics.

STERCULIACEAE.

WALTHERIA, L.

W. RETICULATA, Hook. f. (3), 231; Anderss. (1), 231, & (2), 99; Rob. & Greenm. (1), 145. — This endemic species which has now been found upon no less than nine islands of the archipelago shows the same sort of formal variation that has been described in the case of *Euphorbia viminea*, Hook. f. (see Rob. & Greenm. (1), 138–139). The original characterization was unfortunately drawn from mixed material from Chatham, James, and Albemarle islands. We may, however, take as typical the form with a very close fine tomentum, small thickish leaves, 1.5 to 2.5 cm. long, with strongly crisped margins. The leaves are rounded rather than cordate at the base, and their indumentum becomes decidedly yellowish in a dried state. This form, assumed as typical, has been collected on GALAPAGOS IDS.: *Edmonston* (hb. Gr.). ALBEMARLE ISL.: *Macrae;* southern part, *Baur*, no. 32 (hb. Gr.); Elizabeth Bay, *Snodgrass & Heller*, nos. 269 (hb. Gr.), 289 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 73 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 162 (hb. Gr.). CHARLES ISL.: *Andersson; Baur*, no. 33 (hb. Gr.). JAMES ISL.: *Douglas;* "*Macrae;*"[1] James Bay, along edge of new lava, *Snodgrass & Heller*, no. 367 (hb. Gr.). JERVIS ISL.: *Baur* (this may belong to one of the following forms). Endemic. From this may be distinguished: —

Forma **acamata**, tomento imprimis ramulorum crassiore valde flavescente; foliis magnis crassiusculis cordatis. — INDEFATIGABLE ISL.: *Baur*, no. 27 (hb. Gr.); *Andersson?* Endemic.

Forma **Anderssonii**, indumento ac illud formae typicae tenui densoque sed griseo et nullo modo flavescente; foliis multo majoribus 4–5.5 cm. longis, 3.2–4.2 latis cordatis. — BARRINGTON ISL.: *Baur*, no. 26 (hb. Gr.); *Snodgrass & Heller*, no. 474 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); *Darwin?* NARBOROUGH ISL.: northern part, *Snodgrass & Heller*, no. 301 (hb. Gr.). TOWER ISL.: *Baur*, no. 30 (hb. Gr.); *Snodgrass & Heller*, no. 797 (hb. Gr.). Endemic.

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[1] Cited by Andersson, but probably a mistake for *Scouler*.

Forma **intermedia**, tomento typico sed minus flavescente: foliis quam illi formae typicae majoribus 3-4 cm. longis sed quam hi formae *Anderssonii* minoribus et minus cordatis. — ABINGDON ISL.: *Snodgrass & Heller*, no. 840 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 28 (hb. Gr.); *Snodgrass & Heller*, no. 757 (hb. Gr.). CHARLES ISL.: *Lee* (hb. U. S. Nat. Mus.); Cuevas Bay, *Baur*, no. 34 (hb. Gr.); *Snodgrass & Heller*, no. 426 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 640 (hb. Gr.). NARBOROUGH ISL.: southern part, 300 to 615 m. alt., *Snodgrass & Heller*, no. 326 (hb. Gr.). Endemic.

TURNERACEAE.

TURNERA, L.

T. ULMIFOLIA, L. Sp. 271 (1753); Hook. f. (4), 262; Anderss. (1), 221, & (2), 93; Urb. Jahrb. Bot. Gard. Berlin, ii. 138 (where spec. is elaborately subdivided). — CHARLES ISL.: *Edmonston* (hb. Gr.). Further distrib. general in the tropics.

PASSIFLORACEAE.

PASSIFLORA, L.

P. FOETIDA, L. Sp. 959 (1753); Cav. Diss. 458, t. 289; Anderss. (1), 221, & (2), 93; Rose (2), 137; Rob. & Greenm. (1), 146. — CHARLES ISL.: upper region, *Andersson; A. Agassiz.* CHATHAM ISL: *A. Agassiz;* southwest end, middle region, *Baur*, no. 159 (hb. Gr.); *Snodgrass & Heller*, no. 496 (hb. Gr.). Further distrib. general in trop. and subtrop. Amer.

P. LINEARILOBA, Hook. f. (3), 222. *P. linearifolia*, Anderss. (1), 221, & (2), 93. ? *P. tridactylites*, Hook. f. (3), 222; Anderss. (1), 221, & (2), 93. *P. suberosa*, var. *lineariloba*, Masters in Mart. Fl. Bras. xiii. pt. 1, 579 (1872). *P. suberosa*, var., Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: *Habel.* CHARLES ISL.: *Darwin;? Anderson.* GARDNER ISL.: *Snodgrass & Heller*, no. 625 (hb. Gr.). HOOD ISL.: *Baur*, no. 160 (hb. Gr.). JAMES ISL.: *Scouler; Douglas.* NARBOROUGH ISL.: southern part, trailing on bushes, rare, 615 m. alt., *Snodgrass & Heller*, no. 321 (hb. Gr.). Endemic. This species seems very different from continental specimens of *P. suberosa*, L., at hand.

P. PUBERULA, Hook. f. (3), 223; Anderss. (1), 221, & (2), 93. — JAMES ISL.: *Darwin.* Endemic. Perhaps a form of *P. suberosa*, L., as considered by several writers.

CARICACEAE.

Carica, L.

C. Papaya, L. Hort. Cliff. 461, & Sp. 1036 (1753); Anderss. (1), 223, & (2), 94. — Charles Isl. : about habitations, *Andersson.* Further distrib. general in tropics.

LOASACEAE.

Mentzelia, L.

M. aspera, L. Sp. 516 (1753); Anderss. (1), 222, & (2), 94; Rob. & Greenm. (1), 146. *?Acrolasia squalida*, Hook. f. (3), 222; Anderss. (1), 222, & (2), 93. — Albemarle Isl. : *Andersson;* Iguana Cove, *Snodgrass* & *Heller*, no. 102 (hb. Gr.); Tagus Cove, common from beach to 310 m. alt., in shady places, *Snodgrass* & *Heller*, no. 175 (hb. Gr.). Charles Isl.: *Darwin ; Andersson;* Cuevas Bay, *Baur*, no. 162 (hb. Gr.); *Snodgrass* & *Heller*, no. 429 (hb. Gr.). Chatham Isl. : *Andersson ;* southwest end, lower region, *Baur*, no. 161 (hb. Gr.); *Snodgrass* & *Heller*, no. 530 (hb. Gr.). Duncan Isl. : *Snodgrass* & *Heller*, no. 689 (hb. Gr.). Gardner Isl.: *Snodgrass* & *Heller*, no. 614 (hb. Gr.). Hood Isl.: *Snodgrass* & *Heller*, no. 719 (hb. Gr.). Indefatigable Isl.: *Andersson ;* northern part, *Snodgrass* & *Heller*, no. 664 (hb. Gr.). James Isl.: *Andersson ;* James Bay, abundant on lava soil in shade, *Snodgrass* & *Heller*, no. 376 (hb. Gr.). Tower Isl.: *Snodgrass* & *Heller*, no. 803 (hb. Gr.). Further distrib. N. Am.

Sclerothrix, Presl.

S. fasciculata, Presl, Symb. Bot. ii. 3, t. 53 (1858). *Ancyrostemma micranthum*, Poepp. & Endl. Nov. Gen. & Sp. iii. 65 (1845). — Albemarle Isl. : Iguana Cove, *Snodgrass* & *Heller*, nos. 123, 128 (both in hb. Gr.). James Isl. : James Bay, common on lava rocks near beach, *Snodgrass* & *Heller*, no. 373 (hb. Gr.). Narborough Isl. : southern part, tolerably common, alt. 615 m., *Snodgrass* & *Heller*, no. 315a. Further distrib. Mex. to Peru and Brazil.

CACTACEAE.

[The plants of this family secured by Messrs. Snodgrass & Heller have been kindly identified by Prof. Karl Schumann of the Royal Botanical Museum, Berlin.]

Cereus.

"According to letter of Weber, February 6, 1903, Schumann's two new species of Cereus are those previously described by Weber as Cereus galapogensis and C. Thouarsii."

Cereus, Mill.

C. GALAPAGENSIS, Weber, Bull. du Mus. d'hist. nat. Paris, 1899, p. 312 (1899). — CHARLES ISL.: *Du Petit-Thouars.* Endemic. This can scarcely be regarded as a described species.

C. nesioticus, K. Sch. nov. sp. in litt., "humilis 30 cm. longitudinem non attingens; caulibus caespitosis et e basi communi in omnes partes more spinarum Echini radiantibus costatis ubique spinulis numerosis atrocastaneis tectis; costis humilibus 3 mm. vix superantibus alte crenatis et in tubercula fere perfecte dissolutis; areolis orbicularibus, 2.5 mm. diametro lano sparso exigue tectis; spinis quam 40 pluribus inaequalibus saepe (praesertim infimis) apice fractis in unam centralem et alias exteriores non distributis, maximis 3 cm. longis omnibus quam setae equinae vix rigidioribus erectis strictis divaricatis non pungentibus; floribus 7 cm. longis; ovario subgloboso subobliquo leviter tuberculato et spinulis ad 5 mm. longis flavo-fuscis radiantibus armato; tubo perigonii angusto item in areolis spinoso, lobis exterioribus lanceolatis 1.2 cm. longis vix 2 mm. latis, interioribus etiam angustioribus et magis linearibus verosimiliter albis; staminibus prope faucem, filamentis perbrevibus non 1 mm. longis, antheris bis vel paulo ultra longioribus; fructu ellipsoideo in summo spinoso-areolato basi acuto 2.5 cm. longo et 1.3 cm. crasso; seminibus numerosis, 1.2 mm. longis ellipsoideis rufis leviter punctatis." — ALBEMARLE ISL.: Black Bight, *Snodgrass & Heller*, no. 923 (hb. Berl. & hb. Gr.); lava fields, Elizabeth Bay, *Snodgrass & Heller*, no. 939 (hb. Berl. & hb. Gr.); Point Christopher, *Snodgrass & Heller*, no. 932 (hb. Berl. & hb. Gr.). NARBOROUGH ISL.: eastern side, on barren black lava, *Snodgrass & Heller*, nos. 919 (hb. Berl. & hb. Gr.), 927 (hb. Berl. & hb. Gr.). "Note. — This species is a very peculiar one from its long brown non-pungent spines, which clothe the stem so densely that its surface is invisible. I have never before seen a species of the genus with such short filaments as in this. The petals are also uncommonly narrow. Probably the flower is white. I think it can hardly be compared with either of the two species of *Cereus* thus far known from the Galapagos Islands. From *C. Thouarsii*, Weber, which is said to be similar to *C. multangularis*, it is perfectly distinguished by the mode of growth and by the much smaller fruit which does not at all resemble a large prune" [K. Sch. in litt.]. Endemic.

C. sclerocarpus, K. Sch. nov. sp. in litt., "arborescens; caule principali 3–6 m. alto 15–22 cm. diametro ramos paucos sibi saepius parallelos gerente; articulis costatis, costis in sectione transversa triangularibus

obtusis 1 cm. altis ope sulcorum acutorum separatis; areolis orbicularibus 3.5 mm. diametro tomento brevi tectis; spinis 20–25 in radiales et centrales non distributis rectis pungentibus maximo 4.5 cm. longo; floribus circa 10–11 cm. longis; ovario tereti squamato; squamis sparsis 1–1.5 mm. longis ovatis acutis; perigonii tubo gracili paucis bracteolis brevibus ornato; lobis exterioribus subspathulatis 3 cm. longis apice erosodenticulatis, interioribus brevioribus angustioribus acuminatisque; staminibus prope faucem perigonii affixis 2 cm. longis; stilo florem fere aequante; stigmatibus 11 fere 2 cm. longis filiformibus; fructu duro strato exteriori perfirmo ovoideo acuto flore marcido coronato 7 cm. longo 3 cm. diametro; seminibus haud numerosis (ovulis plurimis abortivis) disciformibus 1 mm. diametro nigris lucidis leviter foveolatis." — ALBEMARLE ISL.: Pt. Christopher, *Snodgrass & Heller*, nos. 933 (hb. Berl. & hb. Gr.), 934 (hb. Berl. & hb. Gr.); Black Bight, *Snodgrass & Heller*, no. 935 (hb. Berl. & hb. Gr.). "Note. — There is only one species in the Galapagos Islands which may be compared with this, namely *C. galapagensis*, Weber. The characterization of the latter is, however, so imperfect that I cannot identify my species with it." [K. Sch. in litt.]. Endemic. In his field notes Mr. Heller reports a giant *Cereus* on Bindloe (where rare), Chatham, James, and Narborough Islands which was probably *C. sclerocarpus*. It grew upon barren lava.

C. THOUARSII, Weber, Bull. du. Mus. d'hist. nat. Paris, 1899, p. 312 (1899). — CHARLES ISL.: *Du Petit-Thouars*. Endemic. Not satisfactorily described.

OPUNTIA, Raf.

O. GALAPAGEIA, Hensl. Mag. Zoöl. & Bot. i. 467, t. 14, f. 2 (1837); Hook. f. (3), 223; Anderss. (1), 224, & (2), 95; Hemsl. Gard. Chron. ser. 3, xxiv. (1898), p. 265, f. 75; Lindberg, Monatschr. Kakteenk. iv. 120–122, 134–135, & v. 10; K. Schumann, ibid. ix. 19, 20, x. 173, & Gesammtbeschr. Kakteen, 747. — CHARLES ISL.: *Hassler Exp.*, acc. to ms. note of Engelm. (hb. Mo. Bot. Gard.). JAMES ISL.: *Darwin; Hassler Exp.*, acc. to ms. note of Engelm. (hb. Mo. Bot. Gard.). JERVIS ISL.: *Hassler Exp.*, acc. to ms. note of Engelm. (hb. Mo. Bot. Gard.). Endemic.

O. Helleri, K. Sch. nov. sp. in litt., "humilis plus minusve prostrata 30–60 cm. alta dense caespitosa ramosa; articulis lineari-oblongis apice basique acutis planis 11 cm. longis 4 cm. latis tenuibus apice setis fuscis munitis; areolis orbicularibus 2 mm. diametro non manifeste in tuberculis editis capillis paucis albis tectis etiam tomento flavido in parte

superiori instructis; spinis circa 20 inaequalibus 1.5 cm. non superantibus non pungentibus plus minusve arcuatis flavo-fuscis; glochidiis paucis (circa 50) in summa parte areolae sitis et non arcte pungentibus apice obtusis; spinis lateralibus glochidiarum non eminentibus; ovario paulo quam 3 cm. longiore turbinato tuberculato; areolis quam illae articularum non minoribus et a lano modice copioso tectis et a spinis capillaceis modice laxis ad 2 cm. longis flavo-fuscis munitis; perigonio 3–3.5 cm. maximo diametro; lobis exterioribus subulatis, 3 mm. longis, sequentibus late ovatis acutis mucronatisve verosimiliter flavo-viridibus, intimis subobovatis fere 2 cm. longis; staminibus fere in fundo infimo floris crateriformis insertis permultis; stilo 2 cm. longo crasso; stigmatibus 6 erectis incurvatis carnosis percrassis." — WENMAN ISL.: *Snodgrass & Heller*, no. 917 (hb. Berl. & hb. Gr.). "Note. — The relatively large flower brings this species near *O. myriacantha*, Web., from which it differs in the mode of growth, smaller articles, and non-pungent spines." [K. Sch. in litt.]. Endemic.

O. MYRIACANTHA, Weber in Bois, Dictionn. d'horticult. 894 (1898), & Bull. du Mus. d'hist. nat. Paris, 1899, p. 313 (1899). — ALBEMARLE ISL.: *Hassler Exp.*, acc. to ms. note of Engelm. (hb. Mo. Bot. Gard.). CHARLES ISL.: *Du Petit-Thouars* [*Dr. Néboux*] (hb. Mus. d'hist. nat. Paris, & hb. Mo. Bot. Gard.). INDEFATIGABLE ISL.: *Hassler Exp.*, acc. to ms. note of Engelm. (hb. Mo. Bot. Gard.). Endemic.

Opuntias also occur (acc. to field notes of several collectors) upon Abingdon, Barrington, Bindloe, Chatham, Culpepper, Duncan, Hood, Narborough, North and South Seymour, and Tower Islands, but as no specimens of them have been secured it is impossible to refer them with definiteness to any of the foregoing species. Dr. Baur[1] says of the genus: "Die grosse Opuntia hat einen verschiedenen Charakter beinahe auf jeder Insel. Die Opuntia von Barrington, Indefatigable und süd-Albemarle z. B. entwickelt einen sehr hohen Stamm; die von Hood und Charles besitzt einen verhältnissmässig niederen und dickeren Stamm; die Opuntia von Jervis wiederum einen sehr niederen; die Verzweigung beginnt schon kurz über dem Boden; die Opuntia von Tower hat gar keinen Stamm, die Verzweigung beginnt sofort am Boden, es ist ein niederer Busch, aber kein Baum. Die Form von Bindloe zeigt Charaktere, die zwischen den Individuen von Tower und Jervis liegen." It seems not unlikely that the low plant on Tower lacking the main trunk may be the same as Professor Schumann's *O. Helleri* from the not very distant island of Wenman.

[1] Biol. Centralbl. xii. 247 (1892).

LYTHRACEAE.

Cuphea, P. Br.

C. patula, St. Hil. Fl. Bras. Merid. iii. 101; Caruel (1), 624; Koehne in Engl. Jahrb. ii. 165 (1882).—Chatham Isl.: *Chierchia*, acc. to Caruel, l. c. Further distrib. Brazil.

RHIZOPHORACEAE.

Rhizophora, L.

R. Mangle, L. Sp. 443 (1753); Hook. f. (3), 225; Anderss. (1), 247, & (2), 108.—Albemarle Isl.: in swamps north of Tagus Cove, acc. to ms. notes of Mr. Heller; also fringing lagoons on the south and west shores of Elizabeth Bay, acc. to Mr. Heller. Chatham Isl.: *Darwin*. Duncan Isl.: in a swamp on the west coast, acc. to Mr. Heller. Indefatigable Isl.: about lagoons, acc. to Mr. Heller. Narborough Isl.: forming large swamps fringing lagoons, on the east and southeast sides of the island, *Snodgrass & Heller*, no 918 (hb. Gr.). Further distrib. general on trop. shores.

MYRTACEAE.

Psidium, L.

P. galapageium, Hook. f. (3), 224. *P. galapagejum*, Anderss. (1), 247, & (2), 109.—Albemarle Isl.: Iguana Cove, above 125 m. alt., bushes 2.4 to 3.6 m. high, *Snodgrass & Heller*, no. 126 (hb. Gr.). James Isl.: *Scouler; Darwin*. Endemic.

COMBRETACEAE.

Conocarpus, Gaertn.

C. erectus, L. Sp. 176 (1753); Jacq. Stirp. Am. 78, t. 52; Anderss. (1), 247, & (2), 108.—Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 44 (hb. Gr.). Chatham Isl.: somewhat marshy woodland in the littoral region, *Andersson*. James Isl.: *Andersson* (hb. Gr.); abundant along sandy beach, James Bay, *Snodgrass & Heller*, no. 382 (hb. Gr.). Further distrib. W. Ind., Mex., southern U. S., trop. S. Am., introd. in Africa.

Laguncularia, Gaertn.

L. racemosa, Gaertn. Fruct. iii. 209, t. 217, f. 2 (1805); Brandis in Engl. & Prantl, Nat. Pflanzenf. iii. Ab. 7, 127, f. 64. — Albemarle Isl.: Elizabeth Bay, lava fields near beach, *Snodgrass & Heller*, nos. 270 (hb. Gr.), 937 (hb. Gr.); Point Christopher, *Snodgrass & Heller*, no. 931 (hb. Gr.). Narborough Isl.: east side, *Snodgrass & Heller*, no. 920 (hb. Gr.). Further distrib. shores, Mex., W. Ind., S. Am., trop. Afr. Not before recorded from the Galapagos Ids.

MELASTOMACEAE.

Miconia, R. & P.

M. Robinsoniana, Cogniaux, nov. sp. (sect. *Tamonea*); *M.* sp. Rob. & Greenm. (1), 146; "glaberrima; ramis junioribus acute tetragonis non alatis; foliis breviuscule petiolatis, anguste ligulato-oblongis, leviter obtuseque acuminatis, basi breviter attenuatis vel subrotundatis, margine integerrimis, trinerviis vel obscure 5-nerviis, nervulis transversalibus numerosis tenuissimis; floribus sessilibus, secus ramulorum paniculae solitariis; calyce oblongo, limbo leviter dilatato, brevissime 5-lobato, lobis late rotundatis; staminum filamentis glaberrimis.

"Rami robustiusculi, laeves. Petiolus gracilis, leviter tortuosus, 1–1.5 cm. longus. Folia rigidiuscula, utrinque laevia, siccitate non nitida, 14–16 cm. longa, 3–3.5 cm. lata, nervis subtus satis prominentibus. Paniculae majusculae, multiflorae, trichotome ramosae, ramis gracilibus, erectis vel paulo patulis, leviter compressis, articulatis. Bracteae patentissimae, rigidae, triangulari-ovatae, acutae, 1–1.5 mm. longae. Calyx laevis, basi rotundatus, sub apice leviter constrictus, circiter 5 mm. longus. Petala erecta, anguste obovata, obtusa, 6 mm. longa. Staminum filamenta capillaria, 3–4 mm. longa; antherae valde arcuatae, apice longe attenuatae, 4–5 mm. longae. Stylus crassiusculus, glaber, apice arcuatus caeteris rectus, 5 mm. longus, stigmate paulo incrassato. — Affinis *M. nitidissimae*, Cogn. in DC. Monogr. Phan. vii. 748, sed bene distincta." — Chatham Isl.: southwest end, upper region, *Baur*, no. 163 (hb. Gr. & hb. Cogniaux). Endemic.

HALORRHAGIDACEAE.

Myriophyllum, L.

M. sp. Wolf (1), 284. — Charles Isl.: in brook near the hacienda, acc. to Wolf, l. c.

UMBELLIFERAE.

Apium, L.

A. LACINIATUM, Urb. in Mart. Fl. Bras. xi. pt. 1, 343 (1879). *Helosciadium laciniatum*, DC. Mém. Soc. Phys. Genèv. iv. 495 (1828); Hook. f. (3), 215; Anderss. (1), 219, & (2), 92. — CHARLES ISL.: *Darwin*, acc. to Hook. f., l. c. Further distrib. Peru to Chili.

A. LEPTOPHYLLUM, F. Muell. acc. to Benth. Fl. Austr. iii. 372 (1866). *A. Ammi*, Urb. in Mart. Fl. Bras. xi. pt. 1, 341, q. v. for extensive synon. *Helosciadium leptophyllum*, DC. Mém. Soc. Phys. Genèv. iv. 493 (1828); Hook. f. (3), 215; Anderss. (1), 219, & (2), 92. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 41 (hb. Gr.). JAMES ISL.: *Darwin*. Further distrib. N. Am, Mex., S. Am., Austral., etc.

Centella, L.

C. ASIATICA, Urb. in Mart. Fl. Bras. xi. pt. 1, 287 (1879). *Hydrocotyle asiatica*, L. Sp. 234 (1753). *H. repanda*, Pers. Syn. i. 302 (1805); Caruel (1), 623. — CHATHAM ISL.: *Chierchia*, acc. to Caruel. Further distrib. N. Am., S. Am., Asia, etc.

Hydrocotyle, L.

H. **galapagensis**, nov. sp., glaberrima, repens, radicibus ad nodos fibrosis petiolis erectis teretibus, foliis orbicularibus peltatis prope centrum insertis 12–13-radiati-nervatis, margine duplo dentata, nervis venulisque translucentibus, pedunculis erectis, umbellis simplicibus sub 16-floribus non proliferis: involucris bracteis ovatis brevibus pedicellis flores quadri-quintuple excedentibus: calycis limbo obsoleto, petalibus ovatis obtusis patentibus, albis, fructu latiori quam longo basi rotundato vel subcordato. *H. umbellata*, Rob. & Greenm. (1), 146, not L. — CHATHAM ISL.: southwest end, upper region, *Baur*, no. 150 (hb. Gr.). Near *H. umbellata*, L., which it resembles rather closely in habit, flowers, and fruit, the leaves, however, differ rather conspicuously by their doubly dentate not crenate margin from the Linnaean species. Transitional forms have been sought in vain in material of *H. umbellata* from many other parts of the world.

Petroselinum, Koch.

P. SATIVUM, Hoffm. Gen. Umb. 177 (1814); Anderss. (1), 219, & (2), 92. *Apium Petroselinum*, L. Sp. 264 (1753). *Carum Petrose-*

linum, Benth. & Hook. f. Gen. i. 891 (1867). — CHARLES ISL.: cultivated ground, middle and upper region, *Andersson* (hb. Gr.). Introd. from the Old World.

PLUMBAGINACEAE.

PLUMBAGO, L.

P. SCANDENS, L. Sp. ed. 2, 215 (1762); Hook. f. (3), 194; Anderss. (1), 172, & (2), 65; Caruel (1), 623; Rob. & Greenm. (1), 147. — ALBEMARLE ISL.: *Darwin;* southern part, *Baur*, no. 235 (hb. Gr.); mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 284 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 220 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson* (hb. Gr.); *Chierchia; Lee* (hb. U. S. Nat. Mus.); *Baur*, no. 234 (hb. Gr.); *Snodgrass & Heller*, no. 411 (hb. Gr.). CHATHAM ISL.: *Andersson; Snodgrass & Heller*, no. 506 (hb. Gr.). DUNCAN ISL.: *Baur*, no. 236 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson.* Further distrib. general in warm countries.

(*P. tomentosa*, Hook. f., l. c., is a typographical error for *Plantago tomentosa.*)

APOCYNACEAE.

VALLESIA, R. & P.

V. CYMBAEFOLIA, Ort. Hort. Matr. Dec. 58 (1798). *V. glabra*, Link, Enum. Hort. Berol. i. 207 (1821); Hook. f. (3), 205; Anderss. (1) 195, & (2), 78. *Rauwolfia glabra*, Cav. Ic. iii. 50, t. 297 (1795). *Psychotria angustata*, Rob. & Greenm. (1), 146, not Anderss. — GALAPAGOS IDS.: *Edmonston* (hb. Gr.). ALBEMARLE ISL.: Point Christopher, *Snodgrass & Heller*, no. 929 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 926 (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson.* HOOD ISL.: *Baur*, no. 149 (hb. Gr.). Further distrib. S. Am., Mex., W. Ind., Florida.

V. PUBESCENS, Anderss. (1), 195, & (2), 79. — CHARLES ISL.: *Snodgrass & Heller*, no. 451 (hb. Gr.). CHATHAM ISL.: woods in lower region, *Andersson; Snodgrass & Heller*, no. 518 (hb. Gr.). Endemic.

ASCLEPIADACEAE.

ASCLEPIAS, L.

A. ANGUSTISSIMA, Anderss. (1), 196, & (2), 79. *Vincetoxicum?* Rob. & Greenm. (1), 147, in part (as to pl. Albemarle). — ABINGDON

Isl.: *Snodgrass & Heller*, no. 845 (hb. Gr.). Albemarle Isl.: in the driest part of the middle region, *Andersson*; southern part, *Baur*, without number (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 145 (hb. Gr.). Endemic.

Vincetoxicum, Moench.

V.? Rob. & Greenm. (1), 147, in part (as to pl. Charles). — Charles Isl.: Cuevas Bay, *Baur*, without number (hb. Gr.). Sterile and doubtful.

CONVOLVULACEAE.

Calystegia, R. Br.

C. Soldanella, R. Br. Prodr. 483 (1810); Hook. f. (4), 261; Anderss. (1), 212, & (2), 87. *Convolvulus Soldanella*, L. Sp. 159 (1753); Engl. Bot. v. t. 314; Gray, Syn. Fl. N. A. ii. pt. 1, 215. — Charles Isl.: *Edmonston*, acc. to Hook. f., l. c. Further distrib. general, Pacific shores of N. and S. Am., also in Eu., N. Zealand, etc.

Cuscuta, L.

C. acuta, Engelm. Trans. Acad. Sci. St. Louis, i. 497 (1859); Anderss. (2), 89. — Bindloe Isl.: *Snodgrass & Heller*, no. 769 (hb. Gr.), identity doubtful. Charles Isl.: *Andersson*. Chatham Isl.: *Andersson*. Narborough Isl.: southern part, not common, 600 m. alt., *Snodgrass & Heller*, no. 318 (hb. Gr.). Endemic.

C. gymnocarpa, Engelm. Trans. Acad. Sci. St. Louis, i. 496 (1859); Anderss. (2), 89; Rob. & Greenm. (1), 147. *C. sandvicensis*, var. *Mimosae*, Hook. f. (3), 205; Anderss. (2), 89 (*sandwicensis*). *C. sandwichiana*, var. *Mimosae*, Anderss. (1), 214. — Galapagos Ids.: *Habel*. Albemarle Isl.: eastern portion, Cowley Bay, *Baur*, no. 205 (hb. Gr.), parasitic on *Borreria suberecta*, Hook. f., and doubtfully identical with the plant of Darwin. James Isl.: *Darwin*. Endemic.

Evolvulus, L.

E. glaber, Spreng. Syst. i. 862 (1825); Hallier, Jahrb. Hamb. Wiss. Anst. xvi. 22. *E. hirsutus*, HBK. Nov. Gen. & Sp. iii. 117 (1818), not Lam. *E. mucronatus*, Sw. acc. to Wikstr. Vet. Acad. Handl. Stockh. 1827, p. 61. *E. glabriusculus*, Chois. Diss. Conv. 156 (1838); Hook. f. (3), 205; Anderss. (1), 211, & (2), 87; Rose (1), 137; Rob. & Greenm. (1), 147. — Albemarle Isl.: *Andersson*; Iguana Cove,

Snodgrass & Heller, no. 32 (hb. Gr.). CHARLES ISL.: *Snodgrass & Heller*, no. 432 (hb. Gr.); *A. Agassiz* (hb. Gr.); *Baur*. CHATHAM ISL.: *Andersson* (hb. Gr.); southwest end, middle region, *Baur*, no. 203 (hb. Gr.); *Snodgrass & Heller*, no. 517 (hb. Gr.). DUNCAN ISL.: *Snodgrass & Heller*, no. 687 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson*. JAMES ISL.: *Scouler*. SEYMOUR ISL.: north, *Snodgrass & Heller*, no. 564 (hb. Gr.). Further distrib. S. Am., W. Ind. Said by Hallier, l. c, to have been collected on Chatham and Hood Islands by Steindachner; but Dr. Steindachner visited neither of these islands.

E. SIMPLEX, Anderss. (1), 211, & (2), 87; Rob. & Greenm. (1), 147. — CHARLES ISL.: *Baur* (hb. Gr.); *Snodgrass & Heller*, no. 431 (hb. Gr.). CHATHAM ISL.: *Andersson; Baur*, no. 201 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson* (hb. Gr.); northern part, *Snodgrass & Heller*, no. 659 (hb. Gr.). JAMES ISL.: common on bluff near beach, James Bay, *Snodgrass & Heller*, no. 384 (hb. Gr.). Endemic.

IPOMOEA, L.

I. BILOBA, Forsk. Fl. Aegypt.-Arab. 44 (1775); Hook. f. & Jacks. Ind. Kew. i. 1223. *I. Pes-caprae*, Sweet, Hort. Suburb. Lond. 35 (1818); Roth, Nov. Pl. Sp. 109; Anderss. (1), 212, & (2), 87. *I. maritima*, R. Br. Prodr. 486 (1810); Hook. f. (3), 204. — ALBEMARLE ISL.: Black Bight, *Snodgrass & Heller*, no. 257 (hb. Gr.); pebbly beach, Iguana Cove, *Snodgrass & Heller*, no. 125 (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson*. Widely distrib. in trop. reg.

I. BONA-NOX, L. Sp. ed. 2, 228 (1762); Sims, Bot. Mag. t. 752. — ALBEMARLE ISL.: *Snodgrass & Heller*, no. 872 (hb. Gr.). Widely distrib. and extensively cultivated.

I. CAMPANULATA, L. Sp. 160 (1753); Wight, Ic. Pl. Ind. iv. t. 1375. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, no. 43 (hb. Gr.). Further distrib. East India, Malayan Archipelago. This is, I believe, the only instance in which an Old World species occurs on the Galapagos Ids. which has not been reported from any part of the American continent.

I. GALAPAGENSIS, Anderss. (1), 213, & (2), 88. — ALBEMARLE ISL.: *Lee* (hb. U. S. Nat. Mus.); Iguana Cove, *Snodgrass & Heller*, nos. 33 (hb. Gr.), 94 (hb. Gr.). CHARLES ISL.: *Andersson; Snodgrass & Heller*, no. 464 (hb. Gr.). CHATHAM ISL.: *Andersson*. DUNCAN ISL.: *Snodgrass & Heller*, no. 690 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 728 (hb. Gr.). JAMES ISL.: common in any soil, James

Bay, *Snodgrass & Heller*, no. 374 (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 583 (hb. Gr.). Endemic.

I. Habeliana, Oliv. in Hook. Ic. t. 1099 (1871). *I.* sp. Rose (1), 137. — Bindloe Isl.: *Snodgrass & Heller*, no. 759 (hb. Gr.). Duncan Isl.: *A. Agassiz* (hb. U. S. Nat. Mus.); *Snodgrass & Heller*, no. 712 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 616 (hb. Gr.). Hood Isl.: *Habel* (hb. Kew); *Snodgrass & Heller*, no. 751 (hb. Gr.). Tower Isl.: *Snodgrass & Heller*, no. 799 (hb. Gr.). Endemic. A peculiar species with entire ovate-lanceolate attenuate glabrous leaves 12 to 18 cm. long, oblong obtuse sepals and a tubular corolla 9 to 15 cm. long. I am indebted to Dr. H. Hallier of Hamburg for his examination of this species.

I. Kinbergi, Anderss. (1), 212, & (2), 88; Rob. & Greenm. (1), 147. — Galapagos Ids.: *Habel.* Abingdon Isl.: *Snodgrass & Heller*, no. 839 (hb. Gr.). Chatham Isl.: *Andersson.* Indefatigable Isl.: *Andersson;* south of Conway Bay, *Baur*, no. 195 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 674 (hb. Gr.). Jervis Isl.: *Baur*, no. 196 (hb. Gr.). Tower Isl.: *Snodgrass & Heller*, no. 801 (hb. Gr.). Wenman Isl.: *Snodgrass & Heller*, no. 5 (hb. Gr.). Endemic.

I. linearifolia, Hook. f. (3), 204; Anderss. (1), 212, & (2), 88. — James Isl.: *Darwin*, acc. to Hook. f. Endemic. Secured by no other collector. Ascribed in the Index Kewensis to the Cape Verde Ids.

I. Nil, Roth, Catalect. i. 36 (1797). *I. acuminata*, Morong & Britt. Ann. N. Y. Acad. Sci. vii. 169 (1893); Rob. & Greenm. (1), 147; not R. & S. *Pharbitis Nil*, Choisy, Mém. Soc. Phys. Genèv. vi. 441 (1833). — Charles Isl.: *Snodgrass & Heller*, no. 418 (hb. Gr.). Chatham Isl.: southwestern end, lower region, *Baur*, no. 200 (hb. Gr.); *Snodgrass & Heller*, no. 511 (hb. Gr.). Further distrib. general in warm regions.

An indeterminate *Ipomoea* from Indefatigable Isl., mentioned and briefly described by Andersson (1), 214, & (2), 88, may well have been this species.

I. pentaphylla, Jacq. Coll. ii. 297 (1788), & Ic. Pl. Rar. ii. 10, t. 319; Rob. & Greenm. (1), 147. *Batatas pentaphylla*, Choisy, Mém. Soc. Phys. Genèv. vi. 408 (1833); Anderss. (1), 214, & (2). 89. *Merremia pentaphylla*, Hallier in Engl. Jahrb. xvi. 552 (1893). — Abingdon Isl.: *Snodgrass & Heller*, no. 846 (hb. Gr.). Charles Isl.: *Andersson.* Chatham Isl.: *Andersson.* Duncan Isl.: *Snod-*

grass & Heller, no. 707 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 628 (hb. Gr.). HOOD ISL.: *Baur*, no. 198 (hb. Gr.); *Snodgrass & Heller*, no. 729 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson*; northern part, *Snodgrass & Heller*, no. 671 (hb. Gr.). JAMES ISL.: *Andersson*. JERVIS ISL.: *Baur*, no. 199 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass & Heller*, no. 568 (hb. Gr.). TOWER ISL.: *Snodgrass & Heller*, no. 804 (hb. Gr.). Further distrib. general in trop.

I. TUBIFLORA, Hook. f. (3), 204; Anderss. (1), 213, & (2), 88. — JAMES ISL.: *Darwin*, acc. to Hook. f., l. c. Endemic. Secured by no other collector.

BORAGINACEAE.

COLDENIA, L.

C. DARWINI, Gürke in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3a, 90 (1893). *C. Darwinii*, Rob. & Greenm. (1), 147 (excl. pl. Albemarle). *Galapagoa Darwini*, Hook. f. (3), 196; Anderss. (1), 210, & (2), 86, t. 16, f. 1. — GALAPAGOS IDS.: *Edmonston* (hb. Gr.); *Habel*. ALBEMARLE ISL.: *Macrae*. BINDLOE ISL.: *Baur*, no. 383 (hb. Gr.); *Snodgrass & Heller*, no. 764 (hb. Gr.). CHATHAM ISL.: *Darwin*; *Andersson* (hb. Gr.). INDEFATIGABLE ISL.: Conway Bay, *Baur*, no, 385 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 679 (hb. Gr.). JAMES ISL.: Orchilla Bay, *Baur*, no. 384 (hb. Gr.). Endemic.

C. FUSCA, Gürke in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3a, 90 (1893); Rob. & Greenm. (1), 147. *C. Darwinii*, Rob. & Greenm. (1), 147, as to pl. Albemarle. *Galapagoa fusca*, Hook. f. (3), 197; Anderss. (1), 210, & (2), 87. t. 16, f. 2. — ALBEMARLE ISL.: common on tufa soil about Tagus Cove, from beach to summit of hills, *Snodgrass & Heller*, no. 180 (hb. Gr.); southern portion, *Baur*, no. 382 (hb. Gr.). BARRINGTON ISL.: *Snodgrass & Heller*, no. 468 (hb. Gr.). CHARLES ISL.: *Darwin*. CHATHAM ISL.: southwest end, lower region, *Baur*, no. 217 (hb. Gr.). HOOD ISL.: *Baur*, no. 218 (hb. Gr.). INDEFATIGABLE ISL.: in dry sandy places on the shore, *Andersson* (hb. Gr.). SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 587 (hb. Gr.). Endemic.

CORDIA, L.

C. ANDERSSONI, Gürke in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3a, 83 (1893). *Varronia canescens*, Anderss. (1), 203, & (2), 83, t. 11, f. 2. *V. leucophlyctis*, Anderss. (1), 203, & (2), 83, t. 11, f. 1, not

C. leucophlyctis, Hook. f. — CHARLES ISL.: in wooded places, lower region, *Andersson* (hb. Gr.); *Lee* (hb. U. S. Nat. Mus. & hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.). Endemic.

C. GALAPAGENSIS, Gürke, l. c. *C. scaberrima*, Rob. & Greenm. (1), 147, not HBK. *C.* sp., Rob. & Greenm. (1), 147. *Varronia scaberrima*, Anderss. (1), 202, & (2), 82, t. 11, f. 3. — ALBEMARLE ISL.: eastern part, *Baur*, no. 210 (hb. Gr.); Cowley Bay, *Baur*, no. 212 (hb. Gr.); Iguana Cove, *Snodgrass* & *Heller*, nos. 75 (hb. Gr.), 136 (hb. Gr.), 857 (hb. Gr.); mountain north of Elizabeth Bay, *Snodgrass* & *Heller*, no. 291 (hb. Gr.); Tagus Cove, from near beach to 1300 m. alt., *Snodgrass* & *Heller*, nos. 195 (hb. Gr.), 881 (hb. Gr.), 893 (hb. Gr.). DUNCAN ISL.: *Baur*, no. 215 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson;* south of Conway Bay, *Baur*, no. 211 (hb. Gr.). NARBOROUGH ISL.: southern part, growing 1.3 m. high, spreading 2 m. or more, altitude 650 m., *Snodgrass* & *Heller*, nos. 331 (hb. Gr.), 342 (hb. Gr.). Endemic.

C. HOOKERIANA, Gürke, l. c. *C. linearis*, Hook. f. (3), 199; Rob. & Greenm. (1), 147; not DC. *Varronia linearis*, Anderss. (1), 204, & (2), 84, t. 11, f. 4. *Lithocardium Hookerianum*, O. Kuntze, Rev. Gen. ii. 976 (1891). — ALBEMARLE ISL.: Elizabeth Cove, *Snodgrass* & *Heller*, no. 272 (hb. Gr.); Iguana Cove, *Snodgrass* & *Heller*, no. 28 (hb. Gr.); southern portion, *Baur*, no. 213 (hb. Gr.); Tagus Cove, *Snodgrass* & *Heller*, nos. 155 (hb. Gr.), 196 (hb. Gr.), above 650 m., no. 897 (hb. Gr.). CHARLES ISL.: *Baur*, no. 214 (hb. Gr.). JAMES ISL.; *Darwin; Andersson.* NARBOROUGH ISL.: arborescent, 3 or 4 m. high, common in southern part at 600 m. alt., *Snodgrass* & *Heller*, no. 327 (hb. Gr.). Endemic.

C. LEUCOPHLYCTIS, Hook. f. (3), 199; Gürke, l. c. 83; Rob. & Greenm. (1), 147. *Lithocardium leucophlyctis*, O. Kuntze, Rev. Gen. ii. 977 (1891). — GALAPAGOS IDS.; *Habel.* ALBEMARLE ISL.: *Macrae; Darwin.* JAMES ISL.: *Scouler;* ? Orchilla Bay, *Baur*, no. 209 (hb. Gr.). Endemic.

C. LUTEA, Lam. Ill. i. 421 (1791); Hook. f. (3), 198; Rose (1), 137; Rob. & Greenm. (1), 147. *C. rotundifolia*, Ruiz & Pavon, Fl. Per. ii. 24, t. 148, fig. *a* (very bad, especially as to corolla), 1799; Hook. f. & Jacks. Ind. Kew. i. 614 (where ascribed to Panama instead of Peru). *Varronia rotundifolia*, DC. Prodr. ix. 469 (1845). *V. flava*, Anderss. (1), 201, & (2), 82. — GALAPAGOS IDS.: *Habel.* ABINGDON ISL.: *Snodgrass* & *Heller*, no. 821 (hb. Gr.). ALBEMARLE ISL.: *Lee*

(hb. U. S. Nat. Mus.); *Macrae;* Iguana Cove, *Snodgrass & Heller*, no. 74 (hb. Gr.); mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 294 (hb. Gr.); also on lava fields near beach, Elizabeth Bay, *Snodgrass & Heller*, no. 940 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, nos. 159 (hb. Gr.), 925 (hb. Gr.). BARRINGTON ISL.: *Baur*, no. 231 (hb. Gr.); *Snodgrass & Heller*, no. 473 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 232 (hb. Gr.); *Snodgrass & Heller*, no. 787 (hb. Gr.). CHARLES ISL.: *Andersson; A. Agassiz; Baur*, no. 228 (hb. Gr.); *Snodgrass & Heller*, no. 419 (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson* (hb. Gr.); southwest end, lower region, *Baur*, no. 208 (hb. Gr.); *Snodgrass & Heller*, no. 524 (hb. Gr.). DUNCAN ISL.: *A. Agassiz* (hb. Gr.); *Baur*, no. 230 (hb. Gr.); very abundant on hills, *Snodgrass & Heller*, no. 708 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 642 (hb. Gr.). HOOD ISL.: *Baur*, no. 229 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson.* JAMES ISL.: *Andersson;* James Bay, 2 to 3 m. high, not common, *Snodgrass & Heller*, no. 365 (hb. Gr.). JERVIS ISL.: *Baur*, no. 233 (hb. Gr.). SEYMOUR ISL.: north, *Snodgrass & Heller*, no. 569 (hb. Gr.); south, *Snodgrass & Heller*, no. 604 (hb. Gr.). TOWER ISL.: *Snodgrass & Heller*, no. 793 (hb. Gr.). Further distrib. Ecuador, Peru, Bolivia. To our present knowledge this is the most widely distributed plant on the Archipelago, occurring as it does upon no less than fourteen islands. It is, however, remarkably constant in its characters.

C. REVOLUTA, Hook. f. (3), 199. *Varronia revoluta*, Anderss. (1), 204, & (2), 84. *Lithocardium revolutum*, O. Kuntze, Rev. Gen. ii. 977 (1891). — GALAPAGOS IDS.: *Habel.* CHARLES ISL.: *Darwin.* Endemic.

Var. NIGRICANS, Hook. f. (3), 199. *Varronia revoluta*, var. *nigricans*, Anderss. (1), 204, & (2), 84. — ALBEMARLE ISL.: *Macrae.* Endemic.

C. SCOULERI, Hook. f. (3), 200; Rob. & Greenm. (1), 147. *Varronia Scouleri*, Anderss. (1), 204, & (2), 83. *Lithocardium Scouleri*, O. Kuntze, Rev. Gen. ii. 977 (1891). — CHATHAM ISL.: *Andersson;* southwest end, middle region, *Baur*, no. 216 (hb. Gr.). JAMES ISL.: *Scouler.* Endemic.

C. nov. sp.? *C. dasycephala*, Anderss. (1), 204, & (2), 84, not HBK. *Varronia dasycephala*, Hook. f. (4), 261, not Desv. — CHARLES ISL.: *Edmonston* (hb. Gr.). Certainly different from any other species on the Islands, and clearly distinguished from *C. dasycephala* by the simple widely spreading tawny setae which cover the stem. Unfortunately the material is too poor for description. Endemic.

Heliotropium, L.

H. Anderssonii. *H. asperrimum*, Anderss. (2), 86, not R. Br. *Sarcanthus asperrimus*, Anderss. (1), 209. — Indefatigable Isl.: *Andersson* (hb. Gr.). Endemic.

H. curassavicum, L. Sp. 130 (1753); Hook. f. (3), 198; Anderss. (1), 208, & (2), 86; Rose (2), 137, in part; Rob. & Greenm. (1), 147. — Galapagos Ids.: *Habel.* Bindloe Isl.: *Snodgrass & Heller*, no. 766 (hb. Gr.). Chatham Isl.: *Darwin; Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr. & hb. U. S. Nat. Mus.); *Baur*, no. 219 (hb. Gr.); *Snodgrass & Heller*, no. 514 (hb. Gr.). Hood Isl.: *Snodgrass & Heller*, no. 725 (hb. Gr.). Indefatigable Isl.: northern part, *Snodgrass & Heller*, no. 660 (hb. Gr.). Seymour Isl.: south, *Snodgrass & Heller*, no. 560 (hb. Gr.). Further distrib. wide, especially upon trop. shores.

H. indicum, L. Sp. 130 (1753); Hook. f. (4), 261. *Heliophytum indicum*, DC. Prodr. ix. 556; Anderss. (1), 208, & (2) 86. — Charles Isl.: *Edmonston; Lee* (hb. Gr. & hb. U. S. Nat. Mus.); *Snodgrass & Heller*, no. 447 (hb. Gr.). Widely distrib. weed of warm countries.

H. parviflorum, L. Mant. 201 (1771); Hook. f. (3), 198; Rob. & Greenm. (1), 147. *H. curassavicum*, Rose (1), 137, in part. *Heliophytum parviflorum*, DC. Prodr. ix. 553 (1845); Anderss. (1), 208, & (2), 86. — Galapagos Ids.: *Habel.* Abingdon Isl.: *Snodgrass & Heller*, no. 812 (hb. Gr.). Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 80 (hb. Gr.); Tagus Cove, most abundant near the coast, but also found inland to 300 m. alt., *Snodgrass & Heller*, nos. 160 (hb. Gr.), 200 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 486 (hb. Gr.). Charles Isl.: *Darwin; Andersson; Lee* (hb. Gr.); *Baur; Snodgrass & Heller*, no. 463 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr. & hb. U. S. Nat. Mus.); southwest end, upper region, *Baur*, no. 220 (hb. Gr.); lower region, *Baur*, no. 221 (hb. Gr.); *Snodgrass & Heller*, no. 510 (hb. Gr.). Gardner Isl.: *Snodgrass & Heller*, no. 639 (hb. Gr.). Hood Isl.: *Baur*, no. 222 (hb. Gr.), through typographical error ascribed to Duncan Isl. by Rob. & Greenm. l. c.; *Snodgrass & Heller*, no. 747 (hb. Gr.). Indefatigable Isl.: *Andersson.* James Isl.: *Douglas;* James Bay, scattered in lava soil, *Snodgrass & Heller*, no. 357 (hb. Gr.). Narborough Isl.: southern part, rather common at 650 m. alt., *Snodgrass & Heller*, no. 348 (hb. Gr.). Tower Isl.: *Snodgrass & Heller*, no. 792 (hb. Gr.). Widely distrib. in warm countries.

Tournefortia, L.

T. hirsutissima, L. Sp. 140 (1753); Caruel (1), 622. — Chatham Isl. : *Chierchia*, acc. to Caruel. Further distrib. trop. Am. I suspect that Chierchia's specimen will on examination prove to be *T. rufo-sericea*, Hook. f.

T. laurifolia, Vent. Choix Pl. 2 (1803). *T. syringaefolia*, Vahl, Symb. iii. 23 (1794); Anderss. (1), 206, & (2), 84, not Miq.; ? Caruel (1), 622. — Chatham Isl.: *Chierchia*, acc. to Caruel, sterile and doubtful. James Isl.: *Andersson*. Further distrib. Mex., trop. S. Am. A doubtful member of the Galapageian flora.

T. psilostachya, HBK. Nov. Gen. & Sp. iii. 78 (1818); Cham. Linnaea, iv. 470; DC. Prodr. ix. 525; Hook. f. (3), 198 (*psilostachys*); Anderss. (1), 208, & (2), 85; Rob. & Greenm. (1), 147. *? T. difformis*, Anderss. (1), 206, & (2), 85. — Albemarle Isl.: Iguana Cove, the commonest shrub, everywhere from the beach to 650 m., *Snodgrass & Heller*, nos. 81 (hb. Gr.), 120 (hb. Gr.). Charles Isl.: *Lee* (hb. U. S. Nat. Mus.); *Snodgrass & Heller*, no. 436 (hb. Gr.). Chatham Isl.: *Andersson* (*T. difformis*, Anderss.). Hood Isl.: *Baur*, no. 227 (hb. Gr.). James Isl.: *Douglas & Scouler*, acc. to Hook. f.; common near sandy beach, *Snodgrass & Heller*, no. 363 (hb. Gr.). Further distrib. trop. S. Am. This species appears to have recently become abundant in the Galapagos Islands.

T. pubescens, Hook. f. (3), 198; Anderss. (1), 206, & (2), 84; Rob. & Greenm. (1), 147. *T. opaca*, Anderss. (1), 205, & (2), 84; Rob. & Greenm. (1), 147. — Albemarle Isl.: Iguana Cove, abundant near beach, and to 650 m. alt., *Snodgrass & Heller*, no. 119 (hb. Gr.); bushes 2 to 4 m. high, *Snodgrass & Heller*, nos. 135 (hb. Gr.), 870 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, no. 255 (hb. Gr.); southern part, *Baur*, no. 225 (hb. Gr.). Charles Isl.: *Lee* (hb. Gr.). Chatham Isl.: *Darwin;* southwest end, middle region, *Baur*, no. 206 (hb. Gr.). Duncan Isl.: *Baur*, no. 226 (hb. Gr.). Indefatigable Isl.: in wooded places of the lower region, *Andersson* (hb. Gr.). Endemic. I am quite unable to separate *T. opaca*, Anderss., which appears to be only a glabrate state.

T. rufo-sericea, Hook. f. (3), 197; Anderss. (1), 205, & (2), 84; Rob. & Greenm. (1), 147. — Abingdon Isl.: *Snodgrass & Heller*, no. 816 (hb. Gr.). Albemarle Isl.: Iguana Cove, up to 650 m. alt., *Snodgrass & Heller*, nos. 54 (hb. Gr.), 853 (hb. Gr.), 868 (hb. Gr.); southern part, *Baur*, no. 207 (hb. Gr.); Tagus Cove, 1300 m. alt.,

Snodgrass & *Heller*, nos. 883 (hb. Gr.), 884 (hb. Gr.). CHARLES ISL.: *Andersson* (hb. Gr.); *Lee* (hb. Gr. & hb. U. S. Nat. Mus.). JAMES ISL.: *Darwin*. Endemic.

T. STRIGOSA, Anderss. (1), 207, & (2), 85, t. 9, f. 3; Rob. & Greenm. (1), 147. — ALBEMARLE ISL.: southern part, *Baur*, no. 224 (hb. Gr.). CHARLES ISL.: wooded places, lower region, *Andersson*. CHATHAM ISL.: *Andersson*. Endemic. This species is reduced to *T. psilostachya* by Hook. f. & Jacks. (Ind. Kew. ii. 1091), but it differs from that species considerably in pubescence and inflorescence, if (as seems probable) Andersson's plant is represented by Baur's no. 224.

VERBENACEAE.

AVICENNIA, L.

A. OFFICINALIS, L. Sp. 110 (1753). *A. tomentosa*, Jacq. Stirp. Am. 178, t. 112 (1763); Hook. f. (3), 195; Anderss. (1), 201, & (2), 82; Rob. & Greenm. (1), 147. — GALAPAGOS IDS.: *Edmonston; Habel.* ALBEMARLE ISL.: Elizabeth Bay, about lagoons with *Rhizophora*, acc. to Mr. Heller. CHARLES ISL.: Cormorant Bay, *Baur*, no. 171 (hb. Gr.). CHATHAM ISL.: *Darwin*. INDEFATIGABLE ISL.: forming swamps in lagoons on the north coast, acc. to Mr. Heller. JAMES ISL.: *Andersson*; tree 3 to 6 m. high, along margin of a salt pond, James Bay, *Snodgrass* & *Heller*, no. 368 (hb. Gr.). NARBOROUGH ISL.: fringing lagoons on the east coast, acc. to Mr. Heller. SEYMOUR ISL.: south, *Snodgrass* & *Heller*, no. 605 (hb. Gr.). Further distrib. general on trop. shores.

CLERODENDRON, L.

C. MOLLE, HBK. Nov. Gen. & Sp. ii. 244 (1817); Hook. f. (3), 195; Anderss. (1), 201, & (2), 82; Caruel (1), 622; Rose (1), 137; Rob. & Greenm. (1), 147. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: southern portion, *Baur*, no. 168 (hb. Gr.); Iguana Cove, rather common from beach to 300 m. alt., *Snodgrass* & *Heller*, nos. 59 (hb. Gr.), 116 (hb. Gr.), 855 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson; Lee* (hb. U. S. Nat. Mus.); *A. Agassiz; Snodgrass* & *Heller*, no. 443 (hb. Gr.). CHATHAM ISL.: *Andersson; Chierchia; A. Agassiz* (hb. Gr.); in upper wooded region, *Baur*, no. 170 (hb. Gr.). JAMES ISL.: *Scouler; Andersson;* common on lava coast, *Snodgrass* & *Heller*, no. 369 (hb. Gr.). Further distrib. Ecuador.

C. sp. Hook. f. (4), 261, Anderss. (1), 201, & (2), 82. — CHARLES ISL.: *Edmonston*, acc. to Hook. f., l. c.

C. sp. Hook. f., l. c.; Anderss. ll. cc. — CHARLES ISL.: *Edmonston*, acc. to Hook. f., l. c.

DURANTA, L.

D. PLUMIERI, Jacq. Stirp. Am. 186, t. 176, f. 76 (1763). — ALBEMARLE ISL.: mountain east of Tagus Cove, alt. 925 m., *Snodgrass & Heller*, nos. 248 (hb. Gr.), 906 (hb. Gr.). Widely distributed in trop. Am. The form on Albemarle has entire leaves and is closely matched by some specimens from Mexico.

LANTANA, L.

L. PEDUNCULARIS, Anderss. (1), 200, & (2), 81; Rob. & Greenm. (1), 147; *L.* sp. Rose (1), 137. Reduced to *L. odorata*, L., by Griseb. Fl. Brit. W. Ind. 496, and with scarcely a doubt the *L. recta* and *L. canescens* of Hook. f. (3), 195, and Anderss. ll. cc. and consequently *L. odorata*, Anderss. ll. cc. — GALAPAGOS IDS.: *Andersson*, no. 215 (hb. Gr.). ABINGDON ISL.: *Snodgrass & Heller*, no. 813 (hb. Gr.). ALBEMARLE ISL.: *Darwin* (*L. recta*, Hook. f.); *Andersson;* mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 293 (hb. Gr.); eastern portion, Cowley Bay, *Baur*, no. 174 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no 64 (hb. Gr.); Tagus Cove, from beach to 300 m. alt., not common, *Snodgrass & Heller*, no. 201 (hb. Gr.). BARRINGTON ISL.: *Snodgrass & Heller*, no. 476 (hb. Gr.). BINDLOE ISL.: *Baur*, no. 187 (hb. Gr.); *Snodgrass & Heller*, no. 758 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson; Lee* (hb. U. S. Nat. Mus.); *A. Agassiz* (hb. U. S. Nat. Mus.); *Baur*, no. 173 (hb. Gr.); *Snodgrass & Heller*, no. 445 (hb. Gr.). CHATHAM ISL.: *Andersson; Snodgrass & Heller*, no. 515 (hb. Gr.), doubtful form. DUNCAN ISL.: *Baur; Snodgrass & Heller*, no. 700 (hb. Gr.). GARDNER ISL.: *Snodgrass & Heller*, no. 613 (hb. Gr.). HOOD ISL.: *Snodgrass & Heller*, no. 736 (hb. Gr.). INDEFATIGABLE ISL.: *Andersson; Snodgrass & Heller*, no. 657 (hb. Gr.). JAMES ISL.: *Andersson;* the most abundant bush, everywhere in lava soil, 1 to 2 m. high, *Snodgrass & Heller*, no. 381 (hb. Gr.). JERVIS ISL.: *Baur*, no. 176 (hb. Gr.). NARBOROUGH ISL.: southern part, 600 m. alt., *Snodgrass & Heller*, no. 351 (hb. Gr.). TOWER ISL.: *Snodgrass & Heller*, no. 806 (hb. Gr.). Endemic? While treating the plants, here mentioned, provisionally as a single endemic species, I suspect that they may be ultimately identified with

one of the continental American species (cf. *L. lilacina* and *L. canescens*, HBK.), or segregated into several more or less distinct forms. The indefiniteness which now prevails regarding the S. American species of the genus is such as to render the further classification of the Galapageian forms, for the present, impracticable.

Lippia, Houst.

L. canescens, HBK. Nov. Gen. & Sp. ii. 263 (1817). *L. lanceolata*, Rose (1), 137, not Michx. *L. nodiflora*, Cham. Linnaea, vii. 213 (1832); Rob. & Greenm. (1), 147; not Michx. — Charles Isl.: *Lee* (hb. U. S. Nat. Mus.); *Baur*. Chatham Isl.: *A. Agassiz* (hb. U. S. Nat. Mus.); *Baur*, no. 178 (hb. Gr.), a green form. Duncan Isl.: *Snodgrass & Heller*, no. 709 (hb. Gr.). Hood Isl.: around a mud lake, *Snodgrass & Heller*, no. 755 (hb. Gr.). Further distrib. S. Am.

L. rosmarinifolia, Anderss. (1), 198, & (2), 80; Rob. & Greenm. (1), 147. — Abingdon Isl.: *Snodgrass & Heller*, no. 827 (hb. Gr.). Albemarle Isl.: in very dry places of the middle region, *Andersson*; Elizabeth Bay, *Snodgrass & Heller*, no. 280 (hb. Gr.); eastern part, *Baur*, no. 179 (hb. Gr.); Tagus Cove, not common, 150 to 460 m. alt., *Snodgrass & Heller*, nos. 168 (hb. Gr.), 147 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, nos. 233, 251, 888, 890, & 896 (all in hb. Gr.). Nos. 888, 890 & 896 show that the leaves on some branches become strongly toothed. Endemic.

Baur's nos. 181 and 182 (both in hb. Gr.) from eastern Albemarle are probably branches of this species (sterile).

L. salicifolia, Anderss. (1), 198, & (2), 80. — Charles Isl.: in woods on the side of the mountain summit. *Andersson* (hb. Gr.). Endemic.

Stachytarpheta, Vahl.

S. dichotoma, Vahl, Enum. i. 207 (1804); Caruel (1), 622. *S. urticifolia*, Sims, Bot. Mag. t. 1848 (1816). *Verbena dichotoma*, Ruiz & Pav. Fl. Per. i. 23, t. 34, fig. b (1798). *Bouchea* sp. Rob. & Greenm. (1), 147. — Charles Isl.: *Chierchia*, acc. to Caruel, l. c.; *Lee* (hb. Gr.); *Baur*, without number (hb. Gr.). Further distrib. trop. and subtrop. Am.

Verbena, L.

V. carolina, L. Syst. ed. 10, 852 (1760); Mill. Dict. ed. 8, no. 7. *V. polystachya*, HBK. Nov. Gen. & Sp. ii. 274 (1817); Hook. f. (3),

195, as var. *V. caroliniana*, Anderss. (1), 199, & (2), 81. — JAMES ISL.: *Darwin*, acc. to Hook. f. Further distrib. Mex., Andean S. Am.

V. GRISEA, Rob. & Greenm. (1), 142, 147, where by typographical error ascribed to Albemarle Island. — DUNCAN ISL.: *Baur*, no. 180 (hb. Gr.). Endemic.

V. LITORALIS, HBK. Nov. Gen. & Sp. ii. 276, t. 137 (1817); Hook. f. (3), 195; Anderss. (1), 200, & (2), 81; Rob. & Greenm. (1), 147. — CHARLES ISL.: *Darwin; Baur*, no. 172 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.). Further distrib. Mex., S. Am.

V. OFFICINALIS, L. Sp. 20 (1753); Hook. f. (1), 194; Anderss. (1), 199, & (2), 81. — JAMES ISL.: *Darwin*. Tropics of both hemispheres.

LABIATAE.

HYPTIS, Jacq.

H. CAPITATA, Jacq. Ic. Pl. Rar. i. t. 114; Hook. f. (4), 261; Anderss. (1), 197, & (2), 80. — CHARLES ISL.: *Edmonston*. Further distrib. trop. S. Am., Mex., W. Ind.

H. SUBVERTICILLATA, Anderss. (1), 197, & (2), 80. — ALBEMARLE ISL.: in very sterile places, middle region, *Andersson* (hb. Gr.). INDEFATIGABLE ISL.: *Baur*. (Of this plant, called *H. spicigera* by Rob. & Greenm. (1), 147, unfortunately no specimen was retained at herb. Gray, and it is now impossible to examine the material. I have little doubt, however, that it was *H. subverticillata*.) JAMES ISL.: James Bay, common on lava rocks, *Snodgrass* & *Heller*, no. 356 (hb. Gr.). NARBOROUGH ISL.: northern part, *Snodgrass* & *Heller*, no. 299 (hb. Gr.). Endemic.

SALVIA, L.

S. OCCIDENTALIS, Sw. Prodr. 14 (1788), & Fl. Ind. Occ. i. 43; Hook. f. (3), 200; Anderss. (1), 196, & (2), 79; Rob. & Greenm. (1), 147. — ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, nos. 61 (hb. Gr.), 96 (hb. Gr.); Tagus Cove, *Snodgrass* & *Heller*, no. 217 (hb. Gr.). CHARLES ISL.: *Darwin;* in dry places, upper region, *Andersson*, (hb. Gr.); *Baur*, no. 167 (hb. Gr.); *Snodgrass* & *Heller*, no. 407 (hb. Gr.). CHATHAM ISL.: southwest end, middle region, *Baur*, no. 166 (hb. Gr.). JAMES ISL.: *Darwin;* common on rocks near beach, *Snodgrass* & *Heller*, no. 362 (hb. Gr.). Further distrib. Mex., W. Ind., S. Am. This may perhaps have been the sterile "*Lamiacea*" collected by Chierchia and mentioned by Caruel (1), 622.

S. PROSTRATA, Hook. f. (3), 200; Anderss. (1), 197, & (2), 79. — JAMES ISL.: *Darwin*. Endemic.

S. TILIAEFOLIA, Vahl, Symb. iii. 7 (1794); Hook. f. (3), 200; Anderss. (1), 196, & (2), 79. — CHARLES ISL.: *Darwin*, acc. to Hook. f., l. c. Further distrib. Mex., trop. S. Am.

TEUCRIUM, L.

T. INFLATUM, Sw. Prodr. 88 (1788); Hook. f. (3), 201; Anderss. (1), 197, & (2), 79; Rob. & Greenm. (1), 147. — CHARLES ISL.; *Darwin*; grassy places, upper region, *Andersson* (hb. Gr.). CHATHAM ISL.: southwest end, middle region, *Baur*, no. 164 (hb. Gr.). Further distrib. S. Am.

SOLANACEAE.

ACNISTUS, Schott.

A. ELLIPTICUS, Hook. f. in Miers, Lond. Jour. Bot. iv. 343 (1845), & (3), 203; Anderss. (1), 218, & (2), 91 (*Ancistus*). — CHARLES ISL.: *Darwin*. Endemic.

A. **insularis**, nov. sp., frutex; ramis a cortice griseo-brunnea tectis; ramulis pallidioribus in specimine siccato rugoso-striatis apice foliatis; foliis approximatis alternis obovatis integris penninervatis supra atroviridibus parce pubescentibus subtus pallidioribus molliter pubescentibus basi cuneatis apice rotundatis; pilis indumenti crispis; umbellis sessilibus 2–4-floris; pedicellis elongatis filiformibus nutantibus subglabris apice in calycem incrassatis; calyce campanulato tenui subglabro truncato; corolla tubulosa gradatim ampliata pilis crispis pubescenti; limbo 5-fido; dentibus deltoideis subobtusis; antheris in parte faucium superiori subsessilibus; stylo recto filiforme glabro; stigmate capitato. — *A.* sp. Rob. & Greenm. (1), 147. — CHATHAM ISL.: southwest end, middle region, June, 1891, *Baur*, no. 193 (hb. Gr.). Endemic. Leaf-blade 6 to 8 mm. long, half as broad; petiole 1.5 to 2 cm. long; pedicels 2 to 2.5 cm. long; corolla 3 cm. long; flowers more inclined to be nodding or even pendulous than indicated on the plate. This species must in many points resemble *A. ellipticus*, Hook. f. That, however, is described as having leaves attenuate at both ends and glabrous, the calyx-limb 5-crenate, the style somewhat curved and the stigma obscurely bilobed. PLATE 2, FIG. 3.

Capsicum, L.

C. annuum, L. Sp. 188 (1753) ; Anderss. (1), 215, & (2), 90 ; Rob. & Greenm. (1), 147. — Charles Isl. : *Andersson* (hb. Gr.). Chatham Isl. : *Baur*. Widely distrib. in trop. reg.

Datura, L.

D. Tatula, L. Sp. ed. 2, 256 (1762). — Charles Isl. : *Snodgrass & Heller*, no. 412 (hb. Gr.). Further distrib. U. S., Mex., S. Am.

D. sp. — Albemarle Isl. : Iguana Cove, *Snodgrass & Heller*, no. 124 (hb. Gr.). Differing from the preceding in the having a fine but rather copious pubescence throughout, and fewer weaker bristles on the fruit.

Lycium, L.

L. sp. — Hood Isl. : *Baur*, and probably the same from Seymour Isl. : south, *Snodgrass & Heller*, no. 584 (hb. Gr.). Both sterile and indeterminate.

Lycopersicum, Hill.

L. esculentum, Mill., var. minor, Hook. f. (3), 202 (*Lycopersicon*) ; Anderss. (1), 216, & (2), 90. *L. peruvianum*, Anderss. (1), 216, & (2), 91, at least as to his own plant from Chatham, which entirely lacks the large foliaceous bracts of the S. Am. plant. *L. esculentum*, Rob. & Greenm. (1), 147. — Abingdon Isl. : *Snodgrass & Heller*, no. 843 (hb. Gr.). Albemarle Isl. : *Andersson ?* southern part, *Baur*, no. 188 (hb. Gr.) ; Pt. Christopher, *Snodgrass & Heller*, no. 928 (hb. Gr.) ; Tagus Cove, *Snodgrass & Heller*, no. 911 (hb. Gr.). Chatham Isl. : *Andersson*. Hood Isl. : *Baur*, no. 189 (hb. Gr.) ; *Snodgrass & Heller*, no. 741 (hb. Gr.). James Isl. ; *Darwin* ; *Snodgrass & Heller*, no. 399 (hb. Gr.). Narborough Isl. : Mangrove Point, on rocks above beach, *Snodgrass & Heller*, no. 305 (hb. Gr.). Further distrib. S. Am., Polynesia.

L. peruvianum, Mill., var. parviflorum, Hook. f. (3), 202 (*Lycopersicon peruanum*). — Chatham Isl. : *Darwin*, acc. to Hook. f. Further distrib. Andean S. Am. I have seen no specimens from the Galapagos Ids. with the foliaceous bracts said to be characteristic of this species. A variety of *L. peruvianum* was collected on the Galapagos Islands by Habel.

L. pimpinellifolium, Mill. Dict. ed. 8, no. 4 (*Lycopersicon*, 1768) ; Dun. in DC. Prodr. xiii. pt. 1, 23 ; Hook. f. (3), 202 (*Lycopersicon*) ;

Anderss. (1), 216 & (2), 91. *Solanum pimpinellifolium*, L. Amoen. Acad. iv. 268 (1759). — Galapagos Ids.: *Goodridge* (hb. Gr.). Charles Isl.: *Andersson.* Chatham Isl.: *Darwin; Andersson.* James Isl.: *Andersson.* Further distrib. Andean.

L. sp. — Chatham Isl.: *Snodgrass & Heller*, no. 526 (hb. Gr.). Very likely a mere variety of *L. esculentum*, Mill., but although minutely glandular, quite destitute of the spreading-hirsute character shown by the other Galapageian specimens at hand.

Nicotiana, L.

N. glutinosa, L. Sp. 181 (1753); Hook. f. (3), 202; Anderss. (1), 215, & (2), 89. — Charles Isl.: *Edmonston; Darwin; Andersson.* Further distrib. Andean S. Am.

N. Tabacum, L. Sp. i. 180 (1753); Caruel (1), 622. — Charles Isl.: *Chierchia*, acc. to Caruel, l. c. Further distrib. trop. Am. and widely introduced through cult.

N. sp. Hook. f. (4), 261. — Charles Isl.: *Edmonston*, acc. to Hook. f., l. c.

Physalis, L.

P. angulata, L. Sp. 183 (1753); Anderss. (1), 215, & (2), 90; Rose (1), 137. — Charles Isl.: *Andersson; A. Agassiz*, acc. to Rose, l. c. Chatham Isl.: *Snodgrass & Heller*, no. 522 (hb. Gr.). Further distrib. general in trop. Am.

P. ixocarpa, Brot. in Hornem. Hort. Hafn. Suppl. 26 (1819); Rydberg, Mem. Torr. Club, iv. 334. *P. aequata*, Jacq. f., acc. to Nees, Linnaea, vi. 470 (1831). *P. pubescens*, Rob. & Greenm. (1), 147, as to pl. Charles. — Charles Isl.: Cuevas Bay, *Baur*, no. 186 (hb. Gr.); *Snodgrass & Heller*, no. 434 (hb. Gr.). Widely distrib. in Am.

P. pubescens, L. Sp. 183 (1753); Rob. & Greenm. (1), 147, as to pl. Chatham; Rydberg, Mem. Torr. Club, iv. 322. — Albemarle Isl.: Tagus Cove, abundant in shady places near beach, *Snodgrass & Heller*, nos. 185 (hb. Gr.), 187 (hb. Gr.). Bindloe Isl.: *Snodgrass & Heller*, no. 768 (hb. Gr.). Charles Isl.: *Snodgrass & Heller*, no. 433 (hb. Gr.). Chatham Isl.: southwest end, upper region, *Baur*, no. 185 (hb. Gr.). Hood Isl: *Snodgrass & Heller*, no. 740 (hb. Gr.). a robust large-fruited form of doubtful identity. James Isl.: James Bay, in sand near beach, *Snodgrass & Heller*, no. 388 (hb. Gr.). Nar-

BOROUGH ISL.: southern part, *Snodgrass & Heller*, no. 303 (hb. Gr.). Widely distrib. in Am.

P. sp. Hook. f. (4), 261. — CHARLES ISL.: *Edmonston.*

SOLANUM, L.

S. EDMONSTONEI, Hook. f. (3), 201; Dun. in DC. Prodr. xiii. pt. 1, 45; Anderss. (1), 216, & (2), 90. — CHARLES ISL.: *Edmonston.* Endemic.

S. NIGRUM, L. Sp. 186 (1753); Hook. f. (3), 201; Anderss. (1), 216, & (2), 90; Rob. & Greenm. (1), 147. This is, with little doubt, the *S. Berterii* of Caruel (1), 622, perhaps also of "Hort. Par. 1835" [1829 ?], a nomen nudum, so far as I have learned. — ALBEMARLE ISL.: southern part, *Baur*, no. 192 (hb. Gr.). CHARLES ISL.: *Darwin; Andersson* (hb. Gr.). CHATHAM ISL: *Chierchia; Snodgrass & Heller*, no. 521 (hb. Gr.). DUNCAN ISL.: *Baur*, no. 191 (hb. Gr.). JAMES ISL.: *Scouler; Darwin;* James Bay, scattered on sandy beach, *Snodgrass & Heller*, no. 387 (hb. Gr.). Further distrib. general. Various forms have been distinguished as to foliage and pubescence.

[S. TUBEROSUM, L., was included by Andersson in his second work (p. 90) but only on the basis of cultivated specimens.]

S. VERBASCIFOLIUM, L. Sp. 184 (1753); Jacq. Hort. Vindob. i. t. 13; Hook. f. (3), 201; Anderss. (1), 215, & (2), 90. — CHARLES ISL.: *Andersson.* JAMES ISL.: *Darwin.* NARBOROUGH ISL.: southern part, rare, 650 m. altitude, *Snodgrass & Heller*, nos. 329 (hb. Gr.), 353 (hb. Gr.). Further distrib. wide in trop. reg. Andersson, ll. cc., distinguishes two Galapageian forms on foliar differences.

S. sp. Hook. f. (4), 261. — CHARLES ISL.: *Edmonston*, acc. to Hook. f.

S. sp. Hook. f., l. c. — CHARLES ISL.: *Edmonston*, acc. to Hook. f.

THINOGETON, Benth.

T. HOOKERI, Anderss. (1), 217. — INDEFATIGABLE ISL.: *Andersson*, Endemic. Omitted by Andersson from his second paper.

T. MIERSII, Miers, Ann. & Mag. Nat. Hist. ser. 2, iv. 359 (1849); Anderss. (1), 217, & (2), 91; Dun. in DC. Prodr. xiii. 689. *Dictyocalyx Miersii*, Hook. f. (3), 203; Dun. in DC. Prodr. xiii. 538. *Cacabus Miersii*, Wettst. in Engl. & Prantl, Nat. Pflanzenf. iv. Ab. 3b, 16 (1891). *Solanacea*, Rob. & Greenm. (1), 147. — ALBEMARLE ISL.: *Macrae;* Black Bight, *Snodgrass & Heller*, no. 258 (hb. Gr.); Iguana

Cove, *Snodgrass & Heller*, no. 42 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 167 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 475 (hb. Gr.). Charles Isl.: *Darwin; Andersson*. Chatham Isl.: *Andersson; Snodgrass & Heller*, no. 523 (hb. Gr.). Culpepper Isl.: *Snodgrass & Heller*, no. 2 (hb. Gr.), a tomentose form with more sharply toothed leaves. Hood Isl.: *Baur*, no. 194 (hb. Gr.). Narborough Isl.: Mangrove Point, *Snodgrass & Heller*, no. 307 (hb. Gr.); northern part, *Snodgrass & Heller*, no. 302 (hb. Gr.). Endemic. Mr. Heller remarks that this species as it occurs upon Culpepper Island recalls a cucumber vine and bears large brown berries. This seems to be a well marked genus, not to be united with *Cacabus*.

SCROPHULARIACEAE.

Capraria, L.

C. biflora, L., var. pilosa, Griseb. Fl. Brit. W. Ind. 427 (1861). *C. biflora*, Anderss. (1), 218, & (2), 91; Rob. & Greenm. (1), 147. — Charles Isl.: in very dry places, *Andersson* (hb. Gr.); *Baur*, no. 184 (hb. Gr.). Chatham Isl.: *Snodgrass & Heller*, no. 509 (hb. Gr.). Further distrib. trop. and subtrop. regions of the New World.

C. peruviana, Benth. in DC. Prodr. x. 430 (1846). — Charles Isl.: *Lee* (hb. U. S. Nat. Mus.). Further distrib. coast of Ecuador to the uplands of Peru. Well marked, although by Hook. f. & Jacks. Ind. Kew. referred to *C. biflora*.

Scoparia, L.

S. dulcis, L. Sp. 116 (1753); Hook. f. (3), 200; Anderss. (1), 218, & (2), 91; Caruel (1), 622; Rob. & Greenm. (1), 147. — Charles Isl.: *Darwin;* in arid grassy places of the middle and upper region, *Andersson; Baur*, no. 183 (hb. Gr.). Chatham Isl.: *Chierchia*, acc. to Caruel, l. c. Further distrib. general in trop. and subtrop. Am.

Scrophulariacea, Hook. f. (3), 200. A dwarf indeterminate plant. — James Isl.: *Darwin*, acc. to Hook. f. (3), 200.

BIGNONIACEAE?

Tecoma, Juss.?

T. sp.? Caruel (1), 622. — Chatham Isl.: *Chierchia*, acc. to Caruel, l. c. Sterile and doubtful even as to family.

ACANTHACEAE.

Dicliptera, Juss.

D. peruviana, Juss. Ann. Mus. Par. ix. 268 (1806); Nees in DC. Prodr. xi. 478; Hook. f. (3), 195; Anderss. (1), 219, & (2), 92. *Dianthera mucronata*, Ruiz & Pav. Fl. Per. i. 11, t. 16, fig. a (1798). *Justicia peruviana*, Lam. Dict. i. 633 (1783). — James Isl.: *Darwin*, acc. to Hook. f., l. c. Further distrib. Andes of Peru.

Justicia, L.

J. (Leptostachya) **galapagana**, Lindau, nov. sp., "herbacea tota glanduloso-pilosa caulibus sexangularibus vel subteretibus, patente pilosis. Folia petiolis 1–2 cm. longis ovata basi rotundata et subito angustata, apice sensim acuminata, acutiuscula, margine integro, cystolithis vix visibilibus. Inflorescentiae pauciflorae, axillares, dichotomae, folia aequantes, apice spiciformes, floribus in axillis bractearum alternantibus. Pedicelli subnulli. Bracteae bracteolaeque subulatae, 0.2 mm. longae, pubescentes pilis glandulosis intermixtis. Calycis laciniae 4, subulatae, 4 mm. longae, 0.75 mm. latae, pubescentia ut in bracteis. Corolla extus dense pubescens tubo 4 mm. longo, basi 2 mm. diametro et apice usque ad 3 mm. ampliato. Labium superum 4 mm. longum, basi 4 mm. latum, dentibus apice minimis, intus rugula[1] instructum, inferum 4 mm. longum, lobis 3 rotundatis, 2 mm. diam. metientibus. Filamenta glabra, 3 mm. longa, antherum loculo supero 1 mm. longo obtuso, infero 1 mm. longo basi in calcar 0.5 mm. longum producto. Pollinis granula pro genere typica, 46–58 μ longa et 27–30 μ diam. Discus adest. Ovarium 1.5 mm. altum, pubescens. Stylus 6 mm. longus, pilosus. Capsula 12 mm. longa, 4 mm. lata, usque ad medium fere in stipitem contracta, pubescens pilis glanduligeris intermixtis, jaculatoribus hamatis, 0.2 mm. longis. Semina 4, brunneo-tomentosa, lentiformis, 0.3 mm. diametro." — Abingdon Isl.: alt. 520 m., *Snodgrass & Heller*, no. 820 (hb. Gr.). "Obs. Proxima *Justiciae Pringlei* Robins., a qua differt pubescentia densiore et magis glutinosa, stylo ovarioque pilosis et maxime seminibus, quae sunt in *J. Pringlei* foveolata et pubescentia, sed in *J. galapagana* laevis et brunneo-tomentosa."

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[1] "Rugula, i. e., ruga longitudinalis a duobus lobis membranae labii superi formata, in qua stylus est inclusus."

Tetramerium, Nees.

T. hispidum, Nees in DC. Prodr. xi. 468 (1847); Gray, Syn. Fl. ii. 330; Hemsl. Biol. Cent.-Am. Bot. ii. 525. Probably the *Tetramerium*, n. sp.? Hook. f. (3), 195; Anderss. (1), 195 & (2), 78. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, nos. 34 (hb. Gr.), 87 (hb. Gr.); mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 288 (hb. Gr.); Tagus Cove, from the coast to 450 m. alt.; *Snodgrass & Heller*, no. 213 (hb. Gr.). James Isl.: *Darwin* (identity doubtful). Further distrib. Cent. Am., Mex., southwestern U. S.

PLANTAGINACEAE.

Plantago, L.

P. major, L. Sp. 112 (1753); Caruel (1), 624. — Chatham Isl.: *Chierchia*. Further distrib. cosmop.

P. tomentosa, var. (?) pumila, Hook. f. (3), 194 (where by typographical error published as *Plumbago*), & (4), 262; Anderss. (1), 171, & (2), 65. — James Isl.: *Darwin*, acc. to Hook. f., l. c. Identity doubtful.

RUBIACEAE.

Borreria, Meyer.

B. basalis, Anderss. (1), 191, & (2), 76, t. 8, f. 4. — Chatham Isl.: in densely grassy regions, *Andersson*. Endemic.

B. Baurii, Rob. & Greenm. (1), 140, 146. *Spermacoce Baurii*, Rob. & Greenm. (1), 141. — Chatham Isl.: lower region, southwest end, *Baur*, no. 144 (hb. Gr.). Endemic.

B. dispersa, Hook. f. (3), 217; Anderss. (1), 191, & (2), 76, t. 8, f. 1; Rob. & Greenm. (1), 146. — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 137 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 215 (hb. Gr.). Charles Isl.: *Darwin; Baur*. Chatham Isl.: southwest end, middle region, *Baur*, no. 743 (hb. Gr.). Indefatigable Isl.: grassy places of the lower region, *Andersson* (hb. Gr.). James Isl.: *Darwin*. Endemic.

B. divaricata, Hook. f. (3), 219; Anderss. (1), 193, & (2), 77; Rob. & Greenm. (1), 146. — Charles Isl.: *Darwin;* Cuevas Bay, *Baur*, no. 141 (hb. Gr.). Endemic.

B. ERICAEFOLIA, Hook. f. (3), 218; Anderss. (1), 192, & (2), 77, t. 8, f. 2; Rob. & Greenm. (1), 146. — ABINGDON ISL.: *Snodgrass & Heller*, no. 831 (hb. Gr.). ALBEMARLE ISL.: Cowley Bay, *Baur*, no. 139 (hb. Gr.); Elizabeth Bay, *Snodgrass & Heller*, no. 275 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 38 (hb. Gr.); mountain east of Tagus Cove, alt. 615 m., *Snodgrass & Heller*, no. 236 (hb. Gr.); southern portion, *Baur*, no. 137 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 157 (hb. Gr.). CHARLES ISL.: Cormorant Bay, *Baur*, no. 138 (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson.* NARBOROUGH ISL.: Mangrove Point, common, scattered in crevices of lava from the beach to 615 m. alt., *Snodgrass & Heller*, no. 308 (hb. Gr.). Endemic. The forms here included in this species differ from each other somewhat in the size, acuteness and pubescence of the leaves. It is not improbable that some of them may be *B. basalis*, Anderss., *B. parvifolia*, Hook. f., or *B. falcifolia*, Hook. f., nearly related species which, to judge from the material at hand, do not appear likely to prove distinct in nature.

B. FALCIFOLIA, Hook. f. (3), 219; Anderss. (1), 193, & (2), 77. *B. lancifolia*, Anderss. (1), 191, & (2), 76, evidently a typographical error for *falcifolia*. — ALBEMARLE ISL.: *Macrae?* acc. to Hook. f., l. c. Endemic.

B. GALAPAGEIA, Rob. & Greenm. (1), 140, 146. *Spermacoce galapageia*, Rob. & Greenm. (1), 141. — DUNCAN ISL.: *Baur*, no. 145 (hb. Gr.). Endemic.

B. LINEARIFOLIA, Hook. f. (3), 217; Anderss. (1), 191, & (2), 76. — JAMES ISL.: *Darwin.* Endemic.

B. OVALIS, Anderss. (1), 192, & (2), 76, t. 8, f. 3. Leaves 6 to 8 mm. long, rounded at the apex. — CHARLES ISL.: in dry and grassy places on the upper part of the island, *Andersson* (hb. Gr.). Endemic.

Forma **abingdonensis.** *B. ovalis*, Rob. & Greenm. (1), 149, as to pl. Abingdon. Foliis ad 1.5 cm. longis plus minusve acutis. — ABINGDON ISL.: *Baur*, no. 142 (hb. Gr.). Endemic.

B. PACIFICA, Rob. & Greenm. (1), 140, 146. *Spermacoce pacifica*, Rob. & Greenm. (1), 141. — INDEFATIGABLE ISL.: south of Conway Bay, *Baur*, no. 146 (hb. Gr.). Endemic.

B. PARVIFOLIA, Hook. f. (3), 218; Anderss. (1), 193, & (2), 77. — GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: *Macrae.* Endemic. A pubescent form of *B. ericaefolia?*

B. PERPUSILLA, Hook. f. (3), 218; Anderss. (1), 192, & (2), 77. — JAMES ISL.: *Darwin*. Endemic.

B. ROTUNDIFOLIA, Anderss. (2), 77. — INDEFATIGABLE ISL.: in grassy places, *Andersson*. Endemic.

B. SUBERECTA, Hook. f. (3), 217; Anderss. (1), 191, & (2), 76. *B. linearifolia*, Rob. & Greenm. (1), 146 (at least in part), not Hook. f. — ALBEMARLE ISL.: *Macrae;* Iguana Cove, *Snodgrass* & *Heller*, no. 129 (hb. Gr.); southern part, *Baur*, nos. 135 (hb. Gr.), 140 (hb. Gr.); Tagus Cove, near beach, *Snodgrass* & *Heller*, no. 204 (hb. Gr.), probably the forma β of Hook. f., l. c. BARRINGTON ISL.: *Baur* (identity doubtful). Endemic.

B. sp. Slender simple stems 5 to 7 cm. high from an apparently annual root: leaves oblong-lanceolate, hispidulous on and near the strongly revolute margin. — CHATHAM ISL.: *Snodgrass* & *Heller*, no. 536 (hb. Gr.). Perhaps a distinct species, but more probably a starved state of one of the above.

CHIOCOCCA, P. Br.

C. RACEMOSA, L. Syst. ed. 10, 917 (1760); Jacq. Stirp. Am. 68; Hook. f. (3), 220; Anderss. (1), 195, & (2), 78. *C. trisperma*, Hook. f. (3), 219; Anderss. (1), 194, & (2), 78, t. 9, f. 2. *C.?* Hook. f. (3), 220. — GALAPAGOS IDS.: *Habel*. ABINGDON ISL.: *Snodgrass* & *Heller*, no. 823 (hb. Gr.). ALBEMARLE ISL.: *Macrae; Andersson;* Elizabeth Bay, *Snodgrass* & *Heller*, no. 267 (hb. Gr.); Iguana Cove, *Snodgrass* & *Heller*, nos. 60 (hb. Gr.), 874 (hb. Gr.); Tagus Cove, 150 to more than 650 m., *Snodgrass* & *Heller*, nos. 144 (hb. Gr.), 172 (hb. Gr.), 899 (hb. Gr.); mountain east of Tagus Cove, alt. 620 m., *Snodgrass* & *Heller*, no. 235 (hb. Gr.), alt. 930 m., *Snodgrass* & *Heller*, no. 234 (hb. Gr.). BINDLOE ISL.: *Snodgrass* & *Heller*, no. 789 (hb. Gr.). CHARLES ISL.: *Andersson* (hb. Gr.). CHATHAM ISL.: *Darwin; Andersson*. JAMES ISL.: *Scouler*. NARBOROUGH ISL.: southern part, 300 to 600 m. alt., scattered but common, 3 to 5 m. in height, *Snodgrass* & *Heller*, no. 350 (hb. Gr.). Widely distrib. in trop. Am. The size of the leaves varies greatly, and changes somewhat with the age of the plant; the fruit is often 2-carpelled and 3-carpelled on the same individual.

DIODIA, L.

D. RADULA, Cham. & Schlecht. Linnaea, iii. 342 (1828); Schumann in Mart. Fl. Bras. vi. pt. 6, 25. *Borreria* (*Spermacoce asperifolia*, Mart.

& Gal. ?), Rob. & Greenm. (1), 146. — Chatham Isl.: southwest end, upper region, *Baur*, no. 147 (hb. Gr.). Further distrib. Brazil.

Psychotria, L.

P. angustata, Anderss. (1), 193, & (2), 78, t. 9, f. 1. Probably *P.* sp. ? Hook. f. (3), 220. — Charles Isl.: *Darwin?;* in most fertile forest regions of the island, *Andersson.* Endemic.

P. rufipes, Hook. f. (3), 220; Anderss. (1), 193, & (2), 77; Rob. & Greenm. (1), 146. — Abingdon Isl.: *Snodgrass & Heller*, no. 817 (hb. Gr.), Albemarle Isl.: Iguana Cove, below 300 m. alt., *Snodgrass & Heller*, nos. 117 (hb. Gr.), 864 (hb. Gr.), 865 (hb. Gr.). Charles Isl.: in the most fertile forests, *Andersson; Lee* (hb. U. S. Nat. Mus.). Chatham Isl.: southwest end, middle region, *Baur*, no. 148 (hb. Gr.). James Isl.: *Darwin.* Endemic.

Relbunium, Benth. & Hook. f.

R. sp. *Rubia* sp. Hook. f. (3), 216; Anderss. (1), 190, & (2), 75; near *R. Relbun.* — Charles Isl.: *Darwin.* Further distrib. Peru, acc. to Hook. f., l. c.

Spermacoce, L.

S. tenuior, L. Sp. 102 (1753), excl. syn. Dill.; Hook. f. (3), 219; Anderss. (1), 193, & (2), 77; Rob. & Greenm. (1), 146. — Chatham Isl.: southwest end, upper region, *Baur*, no. 136 (hb. Gr.). James Isl.: *Darwin.* Widely distrib. in trop. and subtrop. Am.

CUCURBITACEAE.

Citrullus, Neck.

C. vulgaris, Schrad. ex Eckl. & Zeyh. Enum. 279 (1836), & Linnaea, xii. 412; Cogn. in DC. Monogr. iii. 508. *Cucurbita Citrullus*, L. Sp. 1010 (1753). *Cucumis Citrullus*, Ser. in DC. Prodr. iii. 301 (1828); Anderss. (1), 224, & (2), 95. — Charles Isl.: *Andersson*, no. 166. Widely distrib. in warm countries.

Cucurbita, L.

C. Pepo, L. Sp. 1010 (1753); Cogn. in DC. Monogr. iii. 545. *C. Melopepo*, L. l. c.; Anderss. (1), 223, & (2), 94. Charles Isl.: cultivated ground, upper region, *Andersson.* Cosmopolitan.

Elaterium, Jacq.

E. cordatum, Hook. f. (3), 224; Anderss. (1), 224, & (2), 95; Cogn. in DC. Monogr. iii. 859. — James Isl.: *Darwin* (hb. Kew); *Andersson*. Endemic.

Momordica, L.

M. Charantia, L. Sp. 1009 (1753); Sims, Bot. Mag. t. 2455; Cogn. l. c. 436; Rob. & Greenm. (1), 146 (*Charanta*). — Albemarle Isl.: southern part, *Baur*, no. 158 (hb. Gr.). Widely distrib. in trop. reg.

Sicyos, L.

S. villosus, Hook. f. (3), 223; Anderss. (1), 224, & (2), 95; Cogn. l. c. 874. — Charles Isl.: *Darwin*, acc. to Hook. f. Endemic.

CAMPANULACEAE.

Lobelia, L.

L. xalapensis, HBK. Nov. Gen. et Sp. iii. 315 (1818); Hook. f. (3), 206; Anderss. (1), 190, & (2), 75. — Charles Isl. and James Isl.: acc. to Hook. f., probably collected by *Darwin* as suggested by *Andersson*. Further distrib. Mex., W. Ind., S. Am. to Peru.

GOODENIACEAE.

Scaevola, L.

S. Lobelia, Murr. Syst. ed. 13, 178 (1774). *S. Plumieri*, Vahl, Symb. ii. 36 (1791); Hook. f. (3), 205; Anderss. (1), 190, & (2), 75. *Lobelia Plumieri*, L. Sp. 929 (1753). — Galapagos Ids.: *Edmonston* (hb. Gr.). Chatham Isl.: *Darwin; Andersson*. Widely distrib. in warm countries.

COMPOSITAE.

Acanthospermum, Schrank.

A. lecocarpoides, Rob. & Greenm. (1), 141, 146. — Hood Isl.: *Baur*, no. 128; *Snodgrass & Heller*, no. 744 (hb. Gr.). Endemic.

A. **microcarpum**, nov. sp., annuum erectum ramosum 3 dm. altum; caule terete albide hirsuto; foliis oppositis obovato-rhomboideis crenulatis vel obsolete dentatis 3-nervatis parce hirsutis subtus haud vel paulo pali-

dioribus apice obtusis basi longiuscule angustatis sessilibus 3–4.5 cm. longis 1.5–2 cm. latis; capitulis sessilibus ; involucri squamis exterioribus 4–6 oblongis obtusis conspicue ciliatis 4 mm. longis; fructibus triangularibus 6 mm. longis compressis pallidis minute granulatis et spinis brevibus conicis haud vel paulo uncinatis armatis; floribus disci circa 7; corollis pallidis, tubo gracile faucibus subnullis limbo ampliato. — CHARLES ISL.: May, 1899, *Snodgrass & Heller* no. 446 (hb. Gr.). Endemic. Nearly related to *A. hispidum*, DC., but differing considerably in the fruit, as will be seen from PLATE 1, FIGURES 3 and 4, where the fruits of both species are contrasted.

AGERATUM, L.

A. LATIFOLIUM, Hemsl. Biol. Cent.-Am. Bot. ii. 82 (1881), not Cav. (*Coelestina latifolia*, Benth. in Oerst. Vidensk. Meddel. 1852, p. 71; Anderss. (1), 175, & (2), 67; Caruel (1), 623. *A. conyzoides*, Hook. f. (3), 207; Anderss. (1), 175, & (2), 67; Rob. & Greenm. (1), 146; not L. — CHARLES ISL.: *Darwin ; Andersson ; Baur ; Snodgrass & Heller*, no. 423 (hb. Gr.). CHATHAM ISL.: *Chierchia*, acc. to Caruel, l. c. Further distrib. Costa Rica.

APLOPAPPUS, Cass.

A. LANATUS, Hook. f. (3), 215; Anderss. (1), 177, & (2), 68 (*Haplopappus*). — GALAPAGOS IDS.: *Du Petit-Thouars*. Endemic.

BACCHARIS, L.

B. PILULARIS, DC. Prodr. v. 407 (1836); Hook. f. (4), 261 ; Anderss. (1), 178, & (2), 69 ; Gray, Syn. Fl. i. pt. 2, 222. — CHARLES ISL.: *Edmonston*, acc. to Hook. f., l. c. Further distrib. coastal region of California and Oregon. I cannot avoid a suspicion that the Galapageian plant (of which I have seen no specimen) will prove to be not the Californian species but one of several habitally similar plants of trop. S. Am.

B. PINGRAEA, DC., var. ANGUSTISSIMA, DC. Prodr. v. 420 (1836); Rob. & Greenm. (1), 146. — ALBEMARLE ISL.: eastern part, Cowley Bay, *Baur*, no. 124 (hb. Gr.) ; mountain east of Tagus Cove, alt. 960 m., *Snodgrass & Heller*, no. 242 (hb. .Gr). Identification doubtful. Further distrib. coast of Chili.

B. STEETZII, Anderss. (1), 177, & (2), 68. — CHARLES ISL.: in dry places in the middle of the island, *Andersson* (hb. Gr.).

Bidens, L.

B. chilensis, DC. Prodr. v. 603 (1836). — Albemarle Isl.: Tagus Cove, 1230 m. alt., *Snodgrass & Heller*, no. 887 (hb. Gr.). Further distrib. Chili.

B. pilosa, L. Sp. 832 (1753). *B. leucantha*, Willd. Sp. iii. 1719 (1804); Anderss. (1), 187, & (2), 74; Caruel (1), 623; Rob. & Greenm. (1), 147. — Albemarle Isl.: *Andersson.* Charles Isl.: *Andersson.* Chatham Isl.: *Andersson; Chierchia;* southwest end, middle region, *Baur* (hb. Gr.); *Snodgrass & Heller*, no. 534 (hb. Gr.). Widely distrib. in trop. reg.

B. refracta, Brandegee, Zoe, i. 310 (1890). — Albemarle Isl.: Iguana Cove, *Snodgrass & Heller*, no. 92 (hb. Gr.); Tagus Cove, not common inland at 150 to 300 m. alt., *Snodgrass & Heller*, no. 178 (hb. Gr.). Charles Isl.: *Snodgrass & Heller*, no 420 (hb. Gr.). Hood Isl.: *Snodgrass & Heller*, no. 732 (hb. Gr.). James Isl.: James Bay, most abundant herb, growing everywhere in shade of bushes on lava soil, *Snodgrass & Heller*, no. 380 (hb. Gr.). Narborough Isl.: southern part, abundant at 600 m. alt., *Snodgrass & Heller*, nos. 316 (hb. Gr.), 338 (hb. Gr.). Probably a recent introduction from Mexico or Lower California. Palmer's no. 923 (coll. of 1890) from Manzanillo, Mexico, appears to be identical. Plate 2, fig. 4 (drawn from a Galapageian specimen).

Blainvillea, Cass.

B. rhomboidea, Cass. Dict. xxix. 493 (1823); Anderss. (1), 178, & (2), 69; Rob. & Greenm. (1), 146. *Verbesina dichotoma*, Murr. Comm. Goett. ii. 15, t. 4 (1779). — Albemarle Isl.: *Lee* (hb. U. S. Nat. Mus.); Iguana Cove, *Snodgrass & Heller*, no. 99 (hb. Gr.); Tagus Cove, growing everywhere in tufa soil up to 300 m. alt., *Snodgrass & Heller*, no. 184 (hb. Gr.). Barrington Isl.: *Snodgrass & Heller*, no. 482 (hb. Gr.). Charles Isl.: *Baur*, no. 118 (hb. Gr.); *Snodgrass & Heller*, no. 442 (hb. Gr.). Chatham Isl.: *Andersson* (hb. Gr.); *Snodgrass & Heller*, no. 535 (hb. Gr.). Duncan Isl.: *Baur*, no. 119 (hb. Gr.); *Snodgrass & Heller*, no. 698 (hb. Gr.). Hood Isl.: *Baur*, no. 117 (hb. Gr.); *Snodgrass & Heller*, no. 720 (hb. Gr.). Indefatigable Isl.: *Andersson;* northern part, *Snodgrass & Heller*, no. 681 (hb. Gr.). James Isl.: James Bay, common in lava soil, *Snodgrass & Heller*, no. 389 (hb. Gr.). Narborough Isl.: southern part, tolerably common at 615 m. alt., *Snodgrass & Heller*, no. 314a (hb.

Gr.). SEYMOUR ISL.: north, *Snodgrass & Heller*, no. 563 (hb. Gr.); south, *Snodgrass & Heller*, no. 600 (hb. Gr.). Widely distrib. weed in trop. reg. Apparently of recent introduction in the Galapagos Ids.

B. TENUICAULIS, Benth. & Hook. f. Gen. Pl. ii. 370. *Wedelia tenuicaulis*, Hook. f. (3), 213; Anderss. (1), 179, & (2), 69; and doubtfully acc. to Hook. f. & Jacks. Ind. Kew. ii. 1226, *Wedelia frutescens*, Hook. f. (4), 261; Anderss. (1), 179, & (2), 69; not Jacq. — ALBEMARLE ISL.: *Macrae*. CHARLES ISL.: *Edmonston* (identity doubtful). Endemic.

BRICKELLIA, Ell.

B. DIFFUSA, Gray, Pl. Wright. i. 86 (1852). — ALBEMARLE ISL.: Iguana Cove, *Snodgrass & Heller*, nos. 51 (hb. Gr.), 72 (hb. Gr.), 93 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 214 (hb. Gr.). Further distrib. Mex. to Braz. Apparently of recent introduction on the Galapagos Islands.

CHRYSANTHELLUM, Rich.

C. ERECTUM, Anderss. (1), 188, & (2), 74. *C. pusillum*, Rose (1), 137, in part (as to pl. Chatham Isl.). — CHATHAM ISL.: *A. Agassiz* (hb. U. S. Nat. Mus.); *Snodgrass & Heller*, nos. 505 (hb. Gr.), 538 (hb. Gr.). INDEFATIGABLE ISL.: in the most grassy places of lower region. *Andersson* (hb. Gr.). NARBOROUGH ISL.: southern part, *Snodgrass & Heller*, no. 314 (hb. Gr.). Endemic.

C. PUSILLUM, Hook. f. (3), 214; Anderss. (1), 188, & (2), 74, t. 6, f. 2; Rose (1), 137, in part (only as to pl. Charles). — ALBEMARLE ISL.: *Darwin*. CHARLES ISL.: in dry somewhat grassy places of lower region, *Andersson* (hb. Gr.); *A. Agassiz* (hb. Gr.); *Snodgrass & Heller*, no. 413 (hb. Gr.) CHATHAM ISL.: *Andersson*. Endemic.

ECLIPTA, L.

E. ERECTA, L. Mant. ii. 286 (1771); Caruel (1), 623. *E. alba*, Hassk. Pl. Jav. Rar. 528 (1848); Rob. & Greenm. (1), 146. *E. procumbens*, Michx. Fl. Bor. Am. ii. 129 (1803). — CHARLES ISL.: *Snodgrass & Heller*, no. 417 (hb. Gr.). CHATHAM ISL.: *Chierchia*, acc. to Caruel, l. c.; southwest end, middle region, *Baur*, no. 106 (hb. Gr.); *Snodgrass & Heller*, no. 539 (hb. Gr.). HOOD ISL.: on margin of a mud lake, *Snodgrass & Heller*, no. 721 (hb. Gr.). A widely distributed weed, probably of recent introduction on the Galapagos.

Elvira, Cass.

E. inelegans. *Desmocephalum inelegans*, Hook. f. (3), 209; Anderss. (1), 178, & (2), 69. — Charles Isl.: *Darwin*. Endemic.

E. repens. *Microcoecia repens*, Hook. f. (3), 209; Anderss. (1), 179, & (2), 69. — Albemarle Isl.: Tagus Cove, alt. 1230 m., *Snodgrass & Heller*, no. 880 (hb. Gr.). James Isl.: *Darwin* (hb. Gr.). Endemic. The plant from Albemarle Island differs from the original material from James Island in not rooting at the lower nodes. Furthermore, the outer bract of the involucre is broadly obovate and subtruncate instead of acuminate as described by Hooker. Mr. W. B. Hemsley has been so kind as to compare the Albemarle plant with some of the original material at Kew and regards them as the same species. A fragment of the Darwin plant, sent many years ago by Mr. Bentham to Dr. Gray, is unfortunately sterile, but agrees closely with the Albemarle plant in all vegetative features except in its evident repent character.

Encelia, Adans.

E. hispida, Anderss. (1), 186, & (2), 73. — Charles Isl.: *Andersson*. Chatham Isl.: in dry grassy places of lower region, *Andersson* (hb. Gr.). Endemic.

Erigeron, L.

E. lancifolius, Hook. f. (3), 208; Anderss. (1), 176, & (2), 67. — Albemarle Isl.: *Darwin;* Elizabeth Bay, *Snodgrass & Heller*, no. 278 (hb. Gr.); Point Christopher, *Snodgrass & Heller*, no. 930 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 909 (hb. Gr.). Narborough Isl.: southern part, common, bushes 6 to 9 dm. high, 150 to 600 m. alt., *Snodgrass & Heller*, no. 328 (hb. Gr.), leaves acute; and no. 344 (hb. Gr.), leaves obtusish to rounded. (Obviously only foliar forms of the same species.) Endemic.

E. linifolius, Willd. Sp. iii. 1955 (1804); Gray, Syn. Fl. i. pt. 2, 221. *E.* sp. Rob. & Greenm. (1), 146. *Conyza ambigua*, DC. Fl. Fr. Suppl. 468 (1815). — Charles Isl.: *Baur*, no. 120 (hb. Gr.). Widely distrib. in trop. and subtrop. reg.

E. tenuifolius, Hook. f. (3), 207; Anderss. (1), 176, & (2), 68 (as to pl. Darwin); Rob. & Greenm. (1), 146. — Abingdon Isl.: *Snodgrass & Heller*, no. 841 (hb. Gr.). Albemarle Isl.: mountain north of Elizabeth Bay, *Snodgrass & Heller*, no. 295 (hb. Gr.); mountain east of Tagus Cove, *Snodgrass & Heller*, nos. 237 (hb. Gr.), 253 (hb.

Gr.); southern part, *Baur*, no. 121 (hb. Gr.); Tagus Cove, alt. 1250 m., *Snodgrass* & *Heller*, no. 889 (hb. Gr.). CHARLES ISL.: *Darwin.* DUNCAN ISL.: *Baur*, no. 122 (hb. Gr.). JAMES ISL.: *Darwin*; James Bay, scattered along the edge of new lava flow, *Snodgrass* & *Heller*, no. 370 (hb. Gr.). Endemic. Leaves varying in length.

E. sp. *E. tenuifolius*, Steetz (not Hook. f.) in Anderss. (1), 176, & (2), 68; Rob. & Greenm. (1), 146. — CHARLES ISL.: *Andersson* (hb. Gr.); *Baur*, no. 123 (hb. Gr). Endemic. Unfortunately known only from sterile specimens.

EUPATORIUM, L.

E. FILICAULE, Sch. Bip. in Gray, Proc. Am. Acad. xxi. 384 (1886). — ALBEMARLE ISL.: Iguana Cove, *Snodgrass* & *Heller*, no. 29 (hb. Gr.). Further distrib. Mex. to Venezuela. The Galapageian plant has a slightly denser inflorescence and more copious and sordid indumentum than the Mexican, but good floral differences do not appear.

E.? sp. Hook. f. (4), 261. — CHARLES ISL.: *Edmonston*, acc. to Hook. f., l. c. Endemic? Andersson (1), 189, & (2), 74, suggests the possibility that this may be *Flaveria Contrayerba*, Pers.

FLAVERIA, Juss.

F. CONTRAYERBA, Pers. Syn. ii. 489 (1807); DC. Prodr. v. 635; Anderss. (1), 189, & (2), 74. — CHARLES ISL.: *Andersson.* Further distrib. trop. Am.

HEMIZONIA, DC.

H. SQUALIDA, Hook. f. (3), 208; Anderss. (1), 190, & (2), 75. — GALAPAGOS IDS.: *Du Petit-Thouars*, acc. to Hook. f., l. c. Endemic.

JAEGERIA, HBK.

J. GRACILIS, Hook. f. (3), 213; Anderss. (1), 179, & (2), 69. — CHARLES ISL.: *Darwin.* Endemic. From the description of the involucre this can hardly be a *Jaegeria.*

J. PROREPENS, Hook. f. (3), 214; Anderss. (1), 179, & (2), 69; Robinson, Proc. Am. Acad. XXXV. 318. — JAMES ISL.: *Darwin.* Endemic. Neither this nor the preceding has been secured by any other collector.

LECOCARPUS, Decaisne.

L. FOLIOSUS, Decaisne, Bot. Voy. Venus, 20 (1864). *L. pinnatifidus*, Decaisne, l. c. t. 14 of Atlas; Hook. f. (3), 210 (identity of the

forms with less cut leaves may be doubted) ; Anderss. (1), 186, & (2), 73; Rob. & Greenm. (1), 146. — GALAPAGOS IDS.: (presumably CHARLES) *Edmonston* (hb. Gr.); *Habel.* CHARLES ISL.: *Darwin ; Du Petit-Thouars ;* in dry places, upper region, *Andersson* (hb. Gr.) ; *Baur.* CHATHAM ISL.: *Darwin,* acc. to Hook. f. Endemic.

LIPOCHAETA, DC.

L. LARICIFOLIA, Gray, Proc. Am. Acad. v. 131 (1862) ; Rose (1), 137. *Macraea laricifolia,* Hook. f. (3), 210 ; Anderss. (1), 186, & (2), 72 ; Caruel (1), 623 ; Rob. & Greenm. (1), 147. *Trigonopterum Ponteni,* Anderss. (1), 184, & (2), 72, t. 6, f. 1. *Lippia?* Rob. & Greenm. (1), 147. — GALAPAGOS IDS.: *Habel.* ABINGDON ISL.: *Snodgrass* & *Heller,* no. 830 (hb. Gr.). ALBEMARLE ISL.: *Darwin ; Macrae ; Andersson ;* Cowley Bay, *Baur,* nos. 181 (hb. Gr.), 182 (hb. Gr.) ; Tagus Cove, *Snodgrass* & *Heller,* nos. 146 (hb. Gr.), 913 (hb. Gr.) ; common bush on hills near the cove and to 180 m. alt., also inland to 450 m., *Snodgrass* & *Heller,* no. 166 (hb. Gr.). CHARLES ISL.: *Darwin ;* wooded region, middle of the island, *Andersson* (hb. Gr.) ; *Lee* (hb. U. S. Nat. Mus.) ; *A. Agassiz ; Baur,* no. 126 (hb. Gr.) ; *Snodgrass* & *Heller,* no. 408 (hb. Gr.). CHATHAM ISL.: *Chierchia ;* southwest part, *Baur,* no. 127 (hb. Gr.). NARBOROUGH ISL. : southern part, bushes 1.3 to 2 m. high at 320 to 650 m. alt., *Snodgrass* & *Heller,* no. 335 (hb. Gr.). Endemic. A species of special interest, showing the strongest of several on the whole rather slight traces of affinity between the flora of the Galapagos Islands and that of the Sandwich Islands (on which occur the remaining species of this small genus).

PECTIS, L.

P. Anderssonii. *P. linearis,* Rob. & Greenm. (1), 147, not La Llave. *Lorentia linearis,* Anderss. (1), 174, & (2), 66. — INDEFATIGABLE ISL.: alt. 60 m., *Andersson ;* south of Conway Bay, *Baur,* no. 125 (hb. Gr.). Endemic.

P. Hookeri. *Lorentia gracilis,* Hook. f. (3), 206 ; Anderss. (1), 174, & (2), 66. *Pectis gracilis,* Rob. & Greenm. (1), 147 (excl. pl. Chatham), not Baker. — ALBEMARLE ISL. : *Macrae.* BARRINGTON ISL. : *Baur,* no. 115 (hb. Gr.) ; *Snodgrass* & *Heller,* no. 465 (hb. Gr.). CHARLES ISL. : *Baur.* HOOD ISL.: *Snodgrass* & *Heller,* no. 726 (hb. Gr.). JAMES ISL. : James Bay, abundant on lava rocks near beach, *Snodgrass* & *Heller,* no. 378 (hb. Gr.). JERVIS ISL.: *Baur,* no. 114 (hb. Gr.). SEYMOUR ISL. : south, *Snodgrass* & *Heller,* no. 592 (hb. Gr.). Endemic.

P. LINIFOLIA, L. Syst. Nat. ed. 10, 1221 (1760); Fernald, Proc. Am. Acad. xxxiii. 85. *P. punctata*, Jacq. Enum. Pl. Carib. 28 (1762), & Stirp. Am. 216, t. 128; Gray, Syn. Fl. i. pt. 2, 362. *Verbesina linifolia*, L. Syst. Nat. ed. 10, 1226 (1760). *Pectidium punctatum*, Less. Linnaea, vi. 707 (1831); DC. Prodr. v. 98; Anderss. (1), 172, & (2), 65. *P. subciliaris*, Anderss. (1), 174, & (2), 66. — CHATHAM ISL.: *Andersson*. INDEFATIGABLE ISL.: *Andersson*. SEYMOUR ISL.: south, *Snodgrass & Heller*, no. 591 (hb. Gr.). Further distrib. Mex., W. Ind., northern S. Am. Several forms are distinguished by Andersson.

P. SUBSQUARROSA, Sch. Bip. in Seem. Bot. Herald, 309 (1852–1857). *Lorentia subsquarrosa*, Hook. f. (3), 206. — GALAPAGOS IDS.: *Habel*. CHATHAM ISL.: *Darwin*. Endemic.

P. TENUIFOLIA, Sch. Bip. in Seem. Bot. Herald, 309 (1852–1857); Rob. & Greenm. (1), 147. *P. gracilis*, Rob. & Greenm. (1), 147, as to pl. Chatham. *Lorentia tenuifolia*, DC. Prodr. v. 103 (1836); Hook. f. (3), 206; Anderss. (1), 174, & (2), 66. *L. subsquarrosa*, Anderss. (1), 175, & (2), 67, as to pl. Albemarle. — ALBEMARLE ISL.: *Macrae* (type); *Andersson;* Black Bight, *Snodgrass & Heller*, no. 256 (hb. Gr.); eastern portion, Cowley Bay, *Baur*, no. 116½ (hb. Gr.); Elizabeth Bay, *Snodgrass & Heller*, no. 274 (hb. Gr.); southern part, *Baur*, no. 116 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 148 (hb. Gr.). CHARLES ISL.: *Andersson* (hb. Gr.), labelled in Andersson's hand but not recorded in his published papers; *Snodgrass & Heller*, no. 437 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.); northern part, *Baur*, no. 112 (hb. Gr.), leaves minutely pubescent; *Snodgrass & Heller*, no. 537 (hb. Gr.). INDEFATIGABLE ISL.: northern part, *Snodgrass & Heller*, no. 665 (hb. Gr.), leaves minutely pubescent, involucral bracts acutish. SEYMOUR ISL.: north, *Snodgrass & Heller*, no. 573 (hb. Gr.). Further distrib. shores of Peru? *P. Burchellii*, Bak. in Mart. Fl. Bras. vi. pt. 3, 287 (1884), is habitally similar, but differs in pappus.

POROPHYLLUM, Vaill.

P. ELLIPTICUM, Cass. Dict. xliii. 56 (1826); Anderss. (1), 189, & (2), 75; Rose (1), 137; Rob. & Greenm. (1), 147. *P. ruderale*, Cass. l. c. *Cacalia Porophyllum*, L. Sp. 834 (1753); Cav. Ic. iii. 11, t. 222. —GALAPAGOS IDS.: *Habel*. ABINGDON ISL.: *Snodgrass & Heller*, no. 848 (hb. Gr.). ALBEMARLE ISL.: Tagus Cove Mountain, *Snodgrass & Heller*, no. 224 (hb. Gr). CHARLES ISL.: *Andersson; Baur; Snodgrass & Heller*, no. 430 (hb. Gr.). CHATHAM ISL.: *Andersson* (hb. Gr.);

A. Agassiz (hb. Gr.); southwest end, lower region, *Baur*, no. 133 (hb. Gr.); *Snodgrass* & *Heller*, no. 508 (hb. Gr.). DUNCAN ISL.: *Snodgrass* & *Heller*, no. 688 (hb. Gr.). HOOD ISL.: *Baur*, no. 131 (hb. Gr.); *Snodgrass* & *Heller*, no. 745 (hb. Gr.). INDEFATIGABLE ISL.: *Snodgrass* & *Heller*, no. 654 (hb. Gr.). JAMES ISL.: Orchilla Bay, *Baur*, no. 134 (hb. Gr.); James Bay, abundant on all kinds of soil, *Snodgrass* & *Heller*, no. 358 (hb. Gr.). JERVIS ISL.: *Baur*, no. 133 *bis* (hb. Gr.). Widely distrib. in trop. Am. Now one of the most abundant and generally distributed plants of the islands, but apparently of recent introduction, as it was not noted by Darwin or any of the earlier collectors. Andersson in 1852 found it upon two islands, Baur in 1891 upon five, and Snodgrass & Heller in 1899 upon seven.

SCALESIA, ARN.

S. AFFINIS, Hook. f. (3), 212; Anderss. (1), 182, & (2), 71; Hemsl. in Hook. f. Ic. Pl. xxviii. t. 2718. — CHARLES ISL: *Darwin.* Endemic.

S. ASPERA, Anderss. (1), 180, & (2), 70, t. 7, f. 3. — INDEFATIGABLE ISL.: alt. 65 m., *Andersson* (hb. Gr.). Endemic.

S. ATRACTYLOIDES, Arn. in Lindl. Introd. Nat. Ord. ed. 2, 264, 443 (1836); DC. Prodr. vii. 308; Hook. & Arn. in Hook. Jour. Bot. iii. 312; Hook. f. (3), 210; Anderss. (1), 179, & (2), 69. — GALAPAGOS IDS.: *Cuming.* A plant, from description highly characteristic, never rediscovered on the islands.

S. BAURII, Rob. & Greenm. (1), 141, 146. — DUNCAN ISL.: *Baur*, no. 129 (hb. Gr.). Endemic.

Var. (?) **glabrata**, foliis brevioribus magis ovatis cordatisque supra minute ruguloso-venosis glabratis; lobulis obtusis. — DUNCAN ISL.: *Snodgrass* & *Heller*, no. 706 (hb. Gr.). Very near *S. Snodgrassii* but leaves shorter, more ovate, finely rugulose, less pubescent and nigrescent in drying.

S. DARWINII, Hook. f. (3), 211; Anderss. (1), 179, & (2), 70; Rob. & Greenm. (1), 146; Hemsl. in Hook. f. Ic. Pl. xxviii. t. 2719. — CHARLES ISL.: Cormorant Bay, *Baur*, no. 107 (hb. Gr.). JAMES ISL.: *Darwin.* Endemic.

S. DECURRENS, Anderss. (1), 182, & (2), 71. — ALBEMARLE ISL.: *Baur.* CHARLES ISL.: wooded region of the interior, *Andersson* (hb. Gr.); *Snodgrass* & *Heller*, no. 410 (hb. Gr.). Endemic.

S. DIVISA, Anderss. (1), 179, & (2), 70, t. 7, f. 1. — GALAPAGOS IDS.: *Habel.* CHATHAM ISL.: frequent on the lower stony parts, *Andersson* (hb. Gr.). Endemic.

S. GUMMIFERA, Hook. f. (3), 212; Anderss. (1), 182, & (2), 71, t. 7, f. 2. GALAPAGOS IDS.: *Habel.* ALBEMARLE ISL.: *Macrae;* in the driest places of the middle region, *Andersson;* Elizabeth Bay, *Snodgrass & Heller*, no. 266 (hb. Gr.); Tagus Cove, *Snodgrass & Heller*, no. 150 (hb. Gr.). Endemic.

S. **Helleri,** nov. sp., frutex; ramulis molliter pilosis; novellis albo-pilosissimis, foliis oppositis bi–tripinnatisectis supra viridibus pilis brevissimis conicis scabriusculis subtus paulo pallidioribus glanduloso-puberulis et in nervis hirsutis; pedunculis ad apicem ramuli saepe tribus quam folii multo brevioribus; capitulis eradiatis; involucri hemisphaerici squamis oblongis apice rotundatis obsolete striatis; floribus omnibus ☿ numerosis: corollae puberulae tubo propriori gracile brevi in fauces conspicuas longas rectas ampliato; achenio oblongo valde compresso apice truncato calvo; paleis apice 2–3-dentatis, dentibus laciniato-ciliatis ad apiculum abrupte angustatis. — BARRINGTON ISL.: May, 1899, *Snodgrass & Heller*, no. 466 (hb. Gr.). Endemic. Leaves 8 cm. long, 5 cm. broad; petioles 1.5 to 2 cm. long covered with rather soft and widely spreading pilosity: heads 1.8 cm. in diameter. Well marked by its very deeply cut foliage and rounded involucral bracts. PLATE 1, FIGS. 9 and 10.

S. **Hopkinsii,** nov. sp., frutex; ramis teretibus pallide brunneis pilosis in specimine siccato striatulis; ramulis pilosissimis foliosis plus minusve gummiferis; foliis ovatis planis tenuibus molliter pubescentibus subtus pallidioribus subargute pinnati-lobatis, apice acutis basi subintegris acutatis; lobulis dentatis; pedunculo gracile a foliis superato piloso; capitulis eradiatis; involucri hemisphaerici squamis oblongis obovatisve acutis villosis leviter striatis; floribus omnibus ☿; corollae tubo gracili saepe curvato haud vel paulo in fauces ampliato pubescenti; achaenio glabro compresso griseo calvo. — ABINGDON ISL.: 520 m. alt., June, 1899, *Snodgrass & Heller*, no. 851 (hb. Gr.). Endemic. Leaves 8 cm. long, half as broad. Petioles 2 cm. long. Heads 1.2 cm. in diameter. With its thin flat soft-pubescent leaves this can scarcely be Mr. Hemsley's *S. retroflexa* nor does it agree with any of the other species heretofore characterized. Although near *S. incisa*, Hook. f., it has more ovate leaves and acuter involucral bracts than that species. PLATE 3, FIG. 1.

S. INCISA, Hook. f. (3), 210; Anderss. (1), 179, & (2), 70; Hemsl. in Hook. f. Ic. Pl. xxviii. t. 2716. — CHATHAM ISL.: *Darwin.* Endemic.

S. **microcephala,** nov. sp., gummifera; ramulis teretibus gracilibus brunneis tenuiter griseo-puberulis, apice foliosis et corymbiferis; foliis ovato-lanceolatis vel lanceolato-oblongis integerrimis attenuato-acutissimis basi rotundato vel ad petioli insertionem subacuminatis dense tomentellis penninervatis subtus pallidioribus 4 to 6 cm. longis 2 cm. latis; petiolis gracilibus exalatis 1.5 cm. longis; capitulis pluribus graciliter pedicellatis corymbos terminales sessiles a foliis superatos formantibus eradiatis 1 cm. longis 7 mm. latis gummiferis; squamis involucri anguste campanulati lanceolato-linearibus attenuatis laxe imbricatis subaequalibus sordide pubescentibus; flosculis ♀ nullis, ☿ 9–12; corollae tubo gracillimo in fauces non ampliato 5 mm. longo minutissime puberulo, limbo 5-dentato recurvato; achenio compresso sparse pubescenti nigrescente lineari-oblongo 4 mm. longo 0.8 mm. lato summo dentes duas nunc breves nunc in aristas parvas productas gerenti; paleis conduplicatis angustis apice argute 3-dentatis puberulis. — ALBEMARLE ISL.: Tagus Cove, 20 January, 1899, *Snodgrass & Heller,* no. 910 (hb. Gr.); mountain east of Tagus Cove, alt. 770 m., *Snodgrass & Heller,* no. 254 (hb. Gr.). NARBOROUGH ISL.: abundant in southern part at 600 m. alt., forming bushes 2.6 to 4 m. high, *Snodgrass & Heller,* no. 343 (hb. Gr.). This last specimen is sterile and somewhat doubtful. It has leaves 7 cm. long and 3 cm. broad. Endemic. PLATE 3, FIGS. 2 and 3.

S. microcephala is well marked among its congeners by its small and more numerous heads, also by the presence of an abortive pappus. These features, however, in the presence of an otherwise close resemblance to the genus *Scalesia* do not appear to form any good ground for generic separation.

S. **narbonensis,** nov. sp., ramis fistulosis foliosis dense breviterque pubescentibus vel subvelutinis teretibus striatis; foliis alternis late ovatis, praeter basis integerrimae acuminati-attenuatae serratis acute acuminatis molliter adpresse pubescentibus, in pagina inferiore pallidioribus supra basem 3-nervatis, nervis lateralibus ramosis; petiolis distinctis semiteretibus exalatis; pedunculis in dichotomis supremis solitariis teretibus gracilibus erectis unibracteatis a foliis superatis: capitulis solitariis involucro campanulato, squamis circa 13 oblongis acutis dense pubescentibus; flosculis ♀ circa 12 squamas involucri paulo excedentibus corollis tubo gracili pubescenti in ligulam breviter oblongam pallidam 5-nervatam dilatatis, achenio pergracili tereto, abortivo: paleis oblongis puberulis valde conduplicatis apice argute 2–3-dentatis: flosculis ♀ numerosis, corollo breviter pubescenti a tubo brevi gracile in fauces teretes longiores 5-nervatis

ampliato : limbo breviter 5-dentato albo-puberulo : achenio puberulo compresso breviter oblongo apice calvo. — NARBOROUGH ISL.: northern part, *Snodgrass & Heller*, no. 297 (hb. Gr.) ; southern part, common at 650 m. alt., *Snodgrass & Heller*, no. 341 (hb. Gr.). Endemic. Leaf-blade 6 to 11 cm. long, half as broad, petioles 1 to 1.5 cm. long : heads 2 cm. in diameter ; ray-flowers including the achene 12 mm. long. This species approaches *S. affinis*, Hook. f., but differs in its alternate more finely toothed leaves, in the branched lateral leaf-nerves which (if the figure in Hook. Icon. t. 2718 be correct) are simple and marginal in *S. affinis*. *S. affinis* would from the figure seem furthermore to have a longer more hirsute type of pubescence. PLATE 3, FIGS. 4, 5, 6, and 7.

S. OVATA, Anderss. (1), 181, & (2), 70. — CHARLES ISL. : upper wooded region, *Andersson ; Lee* (hb. U. S. Nat. Mus.). Endemic.

S. PEDUNCULATA, Hook. f. (3), 211 ; Anderss. (1), 181, & (2), 71 ; Hemsl. in Hook. f. Ic. Pl. xxviii. t. 2717. — JAMES ISL. : *Darwin*. Endemic.

S. RETROFLEXA, Hemsl. in Hook. f. Ic. Pl. xxviii. t. 2715 (1901). — INDEFATIGABLE ISL. : *Habel*. Endemic.

S. **Snodgrassii**, nov sp. *S. Baurii* et *S. retroflexae* affinis, fruticosa, 6–9 dm. alta ; ramis teretibus glabrescentibus foliosis in specimine siccato brunneis tenuiter striatis ramulis parce pilosis et tenuissime glanduloso-puberulis ; foliis planiusculis alternis ovato-oblongis penninervatis supra pilis minutis conicis albis obstitis subtus paulo pallidioribus tenuiter pubescentibus pinnatisectis ; lobis obtusissimis et obtuse dentatis sinis angustatis ; petiolis exalatis puberulis ; pedunculis ad apicem ramuli subtribus gracilibus saepius unibracteatis puberulis et parce pilosis ; capitulis eradiatis ; involucri hemisphaerici squamis obovato-oblongis brevissime acuminatis 3–5-nervatis pubescentibus et breviter ciliatis ; floribus omnibus ☿ ; corollae tubo gracili hispidulo-puberulo saepius arcuato in fauces dilatato ; limbo 5-dentato recurvato ; achenio compresso griseo glabro apice subtruncato obsolete 2-dentato ; paleis striatis conduplicatis argute 2–3-dentatis tenuiter parceque puberulis. — WENMAN ISL. : 8 December, 1898, *Snodgrass & Heller*, no. 10 (hb. Gr.). Endemic. This species is probably nearest *S. retroflexa* recently described by Mr. Hemsley from Indefatigable Island. That, however, has the leaves recurved and somewhat crisped, of slightly different dentation and a corolla decidedly ampliate in the throat ; also villous petioles. *S. Baurii* differs in its rugulose leaves, *S. Hopkinsii* in its very different indumentum, and *S. incisa* in leaf contour and the bluntly toothed chaff. PLATE 3, FIG. 8.

S. n. sp. ? — Albemarle Isl.: Iguana Cove, below 300 m. alt., *Snodgrass & Heller*, no. 856 (hb. Gr.); 300 to 600 m. alt., *Snodgrass & Heller*, no. 869 (hb. Gr.); Tagus Cove, 1230 m. alt., *Snodgrass & Heller*, no. 875 (hb. Gr.). Differing from all the other species in its large broadly ovate more or less cordate subentire leaves. Unfortunately all the specimens are sterile so that there is a slight doubt as to the genus. Endemic.

Sonchus, L.

S. oleraceus, L. Sp. 794 (1753). — Albemarle Isl.: *Snodgrass & Heller*, no. 908 (hb. Gr.); Iguana Cove, *Snodgrass & Heller*, no. 50 (hb. Gr.). Charles Isl.: *Snodgrass & Heller*, no. 404 (hb. Gr.). Cosmop. weed.

Spilanthes, L.

S. Acmella, Murr. Syst. ed. 13, 610 (1774); Hook. f. (4), 261; Anderss. (1), 188, & (2), 74. — Charles Isl.: *Edmonston*, acc. to Hook. f., l. c. Narborough Isl.: southern part, *Snodgrass & Heller*, no. 315 (hb. Gr.). Sterile and doubtful. Widely distrib. in trop. reg.

S. diffusa, Hook. f. (3), 214; Anderss. (1), 188, & (2), 74. — Charles Isl.: *Darwin*. James Isl.: in a smaller form, *Darwin*, acc. to Hook. f., l. c. Endemic.

Tagetes, L.

T. erecta, L. Sp. 887 (1753); Caruel (1), 623. — Chatham Isl.: *Chierchia*, acc. to Caruel, l. c. Widely distrib. in warm reg. as a result of cult.

TABLE I. — Botanical Collections[1] upon the Galapagos Islands.

[The numbers relate exclusively to Pteridophytes and Spermatophytes.]

Collector.	Vessel, etc.	Date.	Islands visited.	Collection determined by.	Remarks.	No. specimens recorded (excl. duplicates).	Plants[2] new to Archipelago.	Plants[2] new to Science.	Specimens examined in preparing this paper.
David Douglas. Dr. John Scouler.	Brig *William & Ann*, Capt. Hanwell (British).	9-12 Jan., 1825.	James.	Sir J. D. Hooker.	Cf. Comp. Bot. Mag. ii. 86–87.	23	23	8	1
James Macrae.	Frigate *Blonde*, Command. Lord George Anson Byron (British).	26 Mar.–2 Apr., 1825.	Albemarle.	Sir J. D. Hooker.	Cf Trans Hort. Soc. Lond. v. p. v., & vi. p. iii.	41	34	20	2
Hugh Cuming.	Private yacht.	1829.	Unascertained.	Ferns by Sir W. J. Hooker.	Cf. Journ. Bot. iii. 325–326.	9	4	2	0
Charles Darwin.	H. M. S. *Beagle*, Capt. Fitz Roy (British).	15 Sept.–20 Oct., 1835.	Albemarle. Charles. Chatham. James.	Sir J. D. Hooker; bryophytes by Wilson.	Plants chiefly in herb Cambridge Univ.	209	154	78	1
Adm. Abel Du Petit-Thouars. Adolphe-Simon Neboux.	Frigate *Vénus* (French).	21 June–15 July, 1838.	Charles.	Joseph Decaisne. Sir J. D. Hooker. Cactaceae by Weber.	Plants in herb. Musée d'Hist. Nat., Paris.	5	3	3	1
Thomas Edmonston. Dr. John Goodridge.	H. M. S. *Herald*, Capt. Beechey (British).	6–16 Jan., 1846.	Charles. Chatham. James.	Sir J. D. Hooker.		41	21	3	13
Capt. James Wood, R.N.	H. M. S. *Pandora* (British).	6–16 Jan., 1846.	Charles. Chatham.	Ferns by Sir W. J. Hooker.	44 ferns received at the Kew Garden in 1854.	27	15	0	0

[1] In addition to the collections here recorded I find references to two plants collected on the Galapagos Islands by a Mr. King, and there is one specimen in the Gray Herbarium said to have been collected on the Galapagos Islands by a Mr. Brace.

[2] By plants are here meant species, varieties, and named forms of pteridophytes and spermatophytes.

TABLE I. — *Continued.*

Collector.	Vessel, etc.	Date.	Islands visited.	Collection determined by.	Remarks.	No. specimens recorded (excl. duplicates).	Plants new to Archipelago.	Plants new to Science.	Specimens examined in preparing this paper.
Prof. N. J. Andersson.	Frigate *Eugenie*, Rear Adm. C. A. Virgin (Swedish).	11–20 May, 1852.	Albemarle. Charles. Chatham. Indefatigable. James.	Phanerogams, ferns, etc., by Prof. N. J. Andersson. Mosses by J. Ängström.		325	111	50	99
Dr. A. Habel.		22 July, 1868–Jan., 1869.	Abingdon. Bindloe. Hood. Indefatigable.	69 species named at Kew.	28 specimens now in hb. Kew.	69	8	2	0
Dr. Thomas Hill. Dr. Franz Steindachner.	*Hassler*, Capt. Philip C. Johnson (American).	10–19 June, 1872.	Albemarle. Charles. Indefatigable. James. Jervis.	A few plants cited in scattered monographs; the lichens determined by Tuckerman.	Plants of Steindachner in hb. Naturh. Mus. Vienna; lichens and algae of Hill in Crypt. hb. Harvard Univ.	96	2	1	2
Dr. Theodor Wolf.	*Venecia*, Capt. Petersen (Ecuadorian).	Aug., 1875.	Albemarle. Charles. Chatham. Indefatigable.	Dr. T. Wolf.	Dr. Wolf states that all his plants were destroyed during storage in Guayaquil.	7	6	0	0
Lieut. Gaetano Chierchia. Lieut. Cesare Marcacci.	Sloop *Vettor Pisani*, Capt. G. Palumbo (Italian).	21–31 Mar., 1884.	Charles. Chatham.	Phanerogams by Prof. T. Caruel. Algae by A. Piccone.	Lieut Marcacci appears to have collected only algae.	44	22	2	0

Prof. Leslie A. Lee.	S S. *Albatross*, Lieut. Comm. Z. L. Tanner, U. S. N. (American).	5–11 Apr., 1888.	Albemarle. Charles. Chatham. Hood. James.	B. L. Robinson.	Plants in U. S. Nat. Museum, a few in herb. Gray.	42	4	0	42
Alexander Agassiz.	S.S. *Albatross* (American).	28 Mar.–4 Apr., 1891.	Charles. Chatham. Duncan. (Also James, on which no plants seem to have been collected.)	Dr. J. N. Rose.	Plants chiefly at U. S. Nat. Museum; some duplicates in herb. Gray.	41	1	0	25
Prof. Georg Baur. C. F. Adams.	Local sloops from Guayaquil.	9 June–6 Sept., 1891.	Abingdon. Albemarle. Barrington. Bindloe. Charles. Chatham. Duncan. Gardner. Hood. Indefatigable. James. Jervis. Tower.	Phanerogams and ferns by B. L. Robinson and J. M. Greenman; lichens by Miss C. E. Cummings.	A nearly complete set in herb. Gray.	385	66	37	346
R. E. Snodgrass. Edmund Heller.	*Julia F. Whalen* (American). Hopkins Exped. from Leland Stanford Jr. Univ.	10 Dec. 1898–June, 1899.	Abingdon. Albemarle. Barrington. Bindloe. Charles. Chatham. Culpepper. Duncan. Gardner. Hood. Indefatigable. James. Narborough. Seymour. Tower. Wenman.	Phanerogams and ferns chiefly by B. L. Robinson; thallophytes and mosses by W. G. Farlow; hepatics by A. W. Evans; Cactaceae by K. Schumann.	A complete set of vascular plants in herb. Gray.	949	78	19	949

TABLE II.

The Distribution of the Pteridophytes and Spermatophytes upon the Galapagos Islands.

[The sign + indicates that a specimen has been examined from the island in question; the sign —, that a record has been found.]

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Acrostichum aureo-nitens			+			+	—								+			
aureum	—												—					
muscosum													—					
viscosum																		
Adiantum aethiopicum	—																	
concinnum		+	+										+		+			
Henslovianum						—	+						—					
incisum	—																	
Kaulfussii							—											
parvulum						—												
patens	—																	
prionophyllum							—											
Aspidium coriaceum													—					
semicordatum	—																	
Asplenium anisophyllum													—					
auritum		+				—	+						—					
var. macilentum	—																	
cicutarium							+											
formosum		+	+			+	—											
furcatum			+										—					
laetum							—											
lunulatum						+												
rhizophyllum													—					
rutaceum	—																	
Serra	—																	
serratum							—											
Blechnum occidentale		+	+			—	+						—					
var. caudatum	—																	
Cheilanthes microphylla			+			—	+											
myriophylla			+															
Cystopteris fragilis						—												
Gleichenia dichotoma	—																	
Gymnogramme chaerophylla						—												
leptophylla						+												
tartarea			+		+	+												
Hypolepis repens	—																	
Nephrodium brachyodon	—																	
macrophyllum	—																	
molle			+			+							—					
unitum						—												

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Nephrodium villosum							—											
Nephrolepis acuta					+													
pectinata							+						—					
Nothochlaena sulphurea			+										—					
Pellaea geraniaefolia	—																	
Polypodium angustifolium													—					
aureum													—					
crassifolium	—																	
incanum			—			—												
lanceolatum			+			—							—					
lepidopteris	—																	
loriceum	—																	
paleaceum			+			—	+											
pectinatum			+			—	+						—					
percussum	—																	
Phyllitidis													—					
pleiosorum													—					
rude	—																	
squamatum		+	+		+	+	+		+						+			
sp.																		—
Pteris aquilina, var. esculenta			+				+											
incisa	—																	
pedata			+			+	+						—					
propinqua, var Cumingiana	—																	
Taenitis angustifolia	—																	
Azolla caroliniana						—												
Salvinia sp.						—												
Lycopodium clavatum							+											
dichotomum	—																	
sp.						—												
sp.						—												
Potamogeton pectinatus			+															
Ruppia maritima			+															
Najas marina, var. latifolia			+															
Anthephora elegans						+	+					—	+					
Aristida divulsa		+			+		+											
repens													—					
subspicata			+	+	+							+	+			+		
villosa														+				
Bouteloua pilosa		+	+	+			—					+	+	+		+		
Cenchrus distichophyllus			+															
granularis			+			+	+									+		
platyacanthus		+	+	+	+	+	+			+	+	+	+		+			
sp.							+											
Chloris anisopoda						+												
elegans						+										+		
radiata						+												
Chusquea sp.			+															

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour	Tower.	Wenman.
Eleusine aegyptica							+				+							
indica						+	+											
Eragrostis bahiensis			+															
ciliaris		+	+		+	+	+				+		+		+		+	
major				+		+	+			+	+					+	+	
pilosa													+					
Eriochloa distachya							+											
Leptochloa albemarlensis			+															
filiformis										+						+		
Lindleyana			+		+		—											
mucronata				+														
virgata						+												
Oplismenus setarius							+											
Panicum colonum						—												
fasciculatum						+						+	+					
fluitans							+				+							
fuscum						—	—											
hirticaulum				+		—	+			+	+	+				+		
var. minus						+	—											
molle							—											
multiculmum			+	+		+			+	+								
sanguinale							+											
serotinum						—												
Paspalum canescens			+			+									+			
conjugatum						—	+											
distichum													+					
longe-pedunculatum			+		+	+												
penicillatum						—												
scrobiculatum							—											
sp.												+						
Pennisetum pauperum			+															
Setaria floriana						—												
setosa			+	+			+		+		+		+		+			
sp.			—															
Sporobolus domingensis		+	+								+							
indicus						+	—											
virginicus			+				+											
Stenotaphrum glabrum			+				+											
Stipa rostrata							+											
Cyperus aristatus			+			—	+						—		+			
brachystachys		+	+			—	+						—					+
confertus			+		+	+	+		+		+	—	—					
esculentus			+				+											
fugax							+											
galapagensis							—											
grandifolius							—											
laevigatus			+															
ligularis			+															
Mutisii			+			+	—			+					+	+		
rotundus			—															

TABLE II.—*continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Cyperus rubiginosus						—	+		+									
var. cornutus						+	+		+		+					+		
strigosus						—	—											
suranimensis													—					
tristachyus							+											
sp.															+			
sp.																		—
Dichronema leucocephala							+											
Eleocharis fistulosa							—											
mutata			+															
Fimbristylis capillaris					+										+			
diphylla											+							
Hemicarpha subsquarrosa							+											
Kyllinga pumila						+												
Scleria pratensis							+											
Lemna sp.						—												
Tillandsia insularis	—								+									
Commelina nudiflora			+			—			+				—					
Commelinacea ?						—												
Hypoxis decumbens						—	+											
Epidendrum spicatum						+							—					
Peperomia flagelliformis													—					
galapagensis													—					
galioides		+																
petiolata													—					
ramulosa						—												
Snodgrassii			+															
n. sp.			+															
sp.							+											
Fleurya aestuans			+			+	+						—			+		
Parietaria debilis						—							—					
Pilea Baurii						+	+											
muscosa													—					
peploides													—					
Phoradendron florianum						—												
galapageium							—											
Henslovii		+	+			—	+								+			
uncinatum																		
Polygonum acuminatum	—																	
galapagense							—					+				+		
Atriplex sp.																		+
sp.							+				+		+					
Alternanthera radicata																		
rigida																		
subscaposa						—												
Amaranthus caracasanus			+			+	+					—						
celosioides						—	—											
sclerantoides				+		—						•			+			
forma chathamensis							+				+							
" hoodensis																		

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Amaranthus spinosus						+												
squarrulosus			+			+	+		+			+		+		+		
urceolatus												−						
viridis				+			+											
Froelichia juncea			+															
lanigera			+															
nudicaulis						+	−											
scoparia															+			
Iresine Edmondstonei						−												
Pleuropetalum Darwinii			+										−					
Telanthera echinocephala		+	+	+		+	+		+	+	+	+	+					
filifolia													−					
flavicoma		+				−				+	+							
frutescens							−											
glaucescens						−	+											
Helleri								+										
var. obtusior																		+
nudicaulis			+			+	+		+				+					
rugulosa							+											
Snodgrassii																+		
strictiuscula			+				+								+			
vestita												+						
Batis maritima													+					
Boussingaultia baselloides						−												
Phytolacca decandra													−					
Boerhaavia erecta			−				+					−						
paniculata													−					
scandens						+	+					−	−					
viscosa			+			+	+			+		+	+					
Cryptocarpus pyriformis			+	+	+	+	−				+		+		+			
Pisonia floribunda			+										−					
Nyctaginacea?																+		
Mollugo flavescens			+			+	+					+						
var. floriana						+												
gracillima			+			+							+					
Snodgrassii			+												+			
Sesuvium Edmonstonei				+		−				+						+		
Portulacastrum			+													+		
Trianthema Portulacastrum				+		+	−		+	+	+	−	−			+		
Portulaca oleracea			+			+	+			+	+							+
Portulaca sp.																		
Drymaria cordata							+						−					
Cissampelos Pareira		+	+			+	+						−					
Brassica campestris						+												
Sinapistrum						−												
Raphanus sativus						−												
Senebiera pinnatifida													−					
Sanguisorbea?						−												
Acacia farnesiana			−															
macracantha						+	−					+	−					

TABLE II.—*continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Acacia tortuosa						—	—						+					
sp.			+															
sp.						—												
sp.													+					
Astragalus Edmonstonei						—												
Caesalpinia Bonducella			+															
pulcherrima						—	—											
Canavalia obtusifolia					+													
Cassia hirsuta						+												
occidentalis			+			+	+											
picta			+				+											
sericea							—					—					+	
Crotalaria glabrescens			+				—											
pumila			+			+	+						+		+	+		
setifera			+															
Dalea parvifolia			+			+	+					+	+					
tenuicaulis			+				—											
Desmanthus depressus						—	+		+	+	+							
Desmodium galapagense													—					
incanum							+											
molle		+	+		+	—				+	+	+		+				
spirale			+		+	+				+	+		+				+	
uncinatum							+											
Erythrina velutina													+					
Galactea Jussiaeana, var. volubilis			+			—	+					+			+		+	
var. glabrescens							+											
n. sp.						—												
Geoffraea superba											+							
Mimosa asperata						—												
Neptunia plena						+	+			+		+		+			+	
Parkinsonia aculeata			+			+	+		+		+						+	
Phaseolus adenanthus											+							
mollis													—	+				
semierectus						+	+											
Piscidia Erythrina							+						—					
Prosopis dulcis		+				+	+		+	+	+	+	+				+	
Rhynchosia minima		+	+	+	+	+	+					+			+			
reticulata							—											
sp.			+															
sp.					+													
Stylosanthes scabra		+	+		+	+						+		+				
Tephrosia cinerea			+	+	+	+	+					+			—	+		
Vigna owahuensis													—					
Oxalis carnosa						—			+									
Cornelli			+	+		+	+		+	+	+	+	+					
corniculata							+											
Linum oligophyllum			+									•						
Kallstroemia adscendens						—	+		—	+	+							
Tribulus cistoides			—			+					+	+	—				+	

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Tribulus cistoides var. anacanthus			+															
sericeus						+	+											
sp.								+										
Zanthoxylum Pterota		+	+			+	+						—		—			
Castela galapageia							—											
forma albemarlensis			+															
" bindloensis					+													
" carolensis						+												
" duncanensis										+								
" jacobensis													+					
" jervensis														+				
Bursera graveolens		+	+	—		—	—					—	—		+		—	
malacophylla																+		
Polygala Andersonii												+						
galapageia		+	+		+	+	+					+		+				
var. insularis			—			—	+							+				
Acalypha Adamsii							+											
albermarlensis			+															
Baurii							+											
chathamensis							+											
cordifolia						—	—											
diffusa			+				—											
flaccida													—					
parvula			+															
reniformis						—												
sericea		+	—		+													
spicata						+	+		+	+	+			+				
strobilifera			+				+											
velutina						+	—											
var. minor						+												
sp				+														
sp.				+														
sp.				+														
sp.												+						
sp.									+									
Croton Scouleri				+	+	+	+				+		+		+		+	
var. albescens			+		+	+							+					
forma microphyllus			+															
var. brevifolius			+			—		+	+	+						+		+
" grandifolius		+				+	+						—				+	
" Macraei			+										+					
Euphorbia amplexicaulis					+		—									+	+	+
apiculata							—											
articulata		+	+		+	+	+						+			+		
diffusa			—									+		+				
flabellaris		+		+		—				+		+	+			+	+	
galapageia						+												
nesiotica																+		
nummularia							+											

TABLE II.—*continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Euphorbia nummularia, var. glabra						+												
pilulifera						+	+						−					
punctulata			−						+		+							
recurva							+											
viminea			+															
forma barringtonensis				+	+													
" carolensis						+												
" castellana																		+
Euphorbia viminea, forma chathamensis							+											
forma jacobensis													+					
" jervensis														+				
var. abingdonensis	+																	
sp.				+														
sp.							+											
sp.						−												
Hippomane Mancinella		+					−											
Manihot utilissima							−											
Phyllanthus carolinensis		+				+	+						+		+			
Ricinus communis						−												
Callitriche sp.						−												
Maytenus obovata		+	+			+	+		+		+		+	+	−	+		
Cardiospermum Corindum		+				−	+					−	+					+
galapageium		+										+						
Dodonaea viscosa		+																
var. spathulata		+																
Sapindus Saponaria		+																
Discaria pauciflora		+	+				+		−		+	−	−			+		
Cissus sicyoides		+		−	+									−				
Vitis vinifera					−													
Corchorus pilobulus		+								+								
Triumfetta semitriloba		+																
Abutilon Anderssonianum	+		+	+	−	+		+	+		+						+	
depauperatum		+	+		−													
Anoda hastata					+													
Bastardia viscosa		+				+												
Gossypium barbadense	+	+	+		+	+		−	+	+		−				+		
Klotzschianum		−		+	−	−					+							
Hibiscus tiliaceus					−													
Malachra capitata												−						
Sida acuta, var. carpinifolia					−													
angustifolia		+			+	+		+	+		+	−		+				
cordifolia		+																
paniculata		+			+													
rhombifolia					+	+												
spinosa		+																
veronicaefolia, var. humilis		+																

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Waltheria reticulata			+			+						+	−					
forma acamata											+							
" Anderssonii				+			+							+			+	
" intermedia		+			+	+				+				+				
Turnera ulmifolia						+												
Passiflora foetida						−	+											
lineariloba						−				+	+		−		+			
puberula													−					
Carica Papaya						−												
Mentzelia aspera			+			+	+		+	+	+	+					+	
Sclerothrix fasciculata			+										+		+			
Cereus galapagensis						−												
nesioticus			+												+			
sclerocarpus			+		?		?						?		?			
Thouarsii						−												
Opuntia galapageia						−							−	−				
Helleri																		+
myriacantha			−			−						−						
sp.		−		−	−		−	−	−		−				−	−	−	
Cuphea patula							−											
Rhizophora Mangle			−				−		−			−			+			
Psidium galapageium			+										−					
Conocarpus erectus			+				−						+					
Laguncularia racemosa			+												+			
Miconia Robinsoniana							+											
Myriophyllum sp.						−												
Apium laciniatum						−												
leptophyllum			+										−					
Centella asiatica							−											
Hydrocotyle galapagensis							+											
Petroselinum sativum						−												
Plumbago scandens			+			+	+		+			−						
Vallesia cymbaefolia			+				−				+							
pubescens						+	+											
Asclepias angustissima		+	+															
Vincetoxicum sp.						+												
Calystegia Soldanella						−												
Cuscuta acuta					+	−	−								+			
gymnocarpa			+										−					
Evolvulus glaber			+			+	+		+		−	−	−				+	
simplex						+	+					+	+					
Ipomoea biloba			+				−											
Bona-nox			+															
campanulata			+															
galapagensis			+			+	−		+		+		+				+	
Habeliana					+				+	+	+							+
Kinbergi		+					−					+		+				+ +
linearifolia													−					
Nil						+	+											
pentaphylla		+				−	−		+	+	+	+	−	+			+	+

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Ipomoea tubiflora			—		+		+					+	+					
Coldenia Darwini			+	+		—	+				+	+				+		
fusca						+	+											
Cordia Andersoni			+				+		+			+			+			
galapagensis						+	+						—		+			
Hookeriana			—		+								+					
leucophlyctis		+	+	+	+	+	+		+	+	+	—	+	+		+	+	
lutea						—												
revoluta			—										—					
var. nigricans							+											
Scouleri						+												
n. sp.?												+						
Heliotropium Andersonii					+		+				+	+				+		
curassavicum						+												
indicum							+											
parviflorum		+	+	+		+	+			+	+	—	+		+		+	
Tournefortia hirsutissima							—						—					
laurifolia							—											
psilostachya			+			+	—				+		+					
pubescens			+			+	+		+			+						
rufo-sericea		+	+			+							—					
strigosa			+			—	—											
Avicennia officinalis			—			+	—					—	+		—	+		
Clerodendron molle			+			+	+						+					
sp.						—												
sp.						—												
Duranta Plumieri			+															
Lantana peduncularis		+	+	+	+	+	+		+	+	+	+	+	+	+		+	
Lippia canescens						+	+		+		+							
rosmarinifolia		+	+															
salicifolia						—												
Stachytarpheta dichotoma						+												
Verbena carolina													—					
grisea									+									
litoralis						+	+											
officinalis													—					
Hyptis capitata						—												
subverticillata			+									+	+		+			
Salvia occidentalis			+			+	+						+					
prostrata													—					
tiliaefolia						—												
Teucrium inflatum						+	+											
Acnistus ellipticus						—												
insularis							+											
Capsicum annuum						+	+											
Datura Tatula						+												
sp.			+								+					+		
Lycium sp.											+							
Lycopersicum esculentum, var. minor		+	+				—				+		+		+			

TABLE II. — *continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Lycopersicum peruvianum, var. parviflorum							−						−					
pimpinellifolium							+											
sp.							+											
Nicotiana glutinosa							−											
Tabacum							−											
sp.							−											
Physalis angulata							−	+										
ixocarpa							+											
pubescens			+		+		+				+		+		+			
sp.							−											
Solanum Edmonstonei							−											
nigrum			+				+	+		+			+					
verbascifolium							−						−		+			
sp.							−											
sp.							−											
Thinogeton Hookeri												−						
Miersii			+	+			−	+	+			+				+		
Capraria biflora							+	+										
Scoparia dulcis							+	−										
Scrophulariacea													−					
Tecoma sp.?								−										
Dicliptera peruviana													−					
Justicia galapagana		+																
Tetramerium hispidum			+										−					
Plantago major								−										
tomentosa, var.?													−					
Borreria basalis								−										
Baurii								+										
dispersa			+				+	+				+	−					
divaricata							+											
ericaefolia		+	+				+	−								+		
falcifolia			−															
galapageia									+									
linearifolia													−					
ovalis							+											
forma abingdonensis		+																
pacifica												+						
parvifolia			−															
perpusilla													−					
rotundifolia												+						
suberecta			+	+														
sp.							+											
Chiococca racemosa		+	+		+	+	−						−		+			
Diodia Radula							+											
Psychotria angustata						−												
rufipes		+	+			+	+						−					
Relbunium sp.						−												
Spermacoce tenuior							+						−					
Citrullus vulgaris						−												

TABLE II.—*continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Cucurbita Pepo						—												
Elaterium cordatum													—					
Momordica Charantia			+															
Sicyos villosus						—												
Lobelia xalapensis						—							—					
Scaevola Lobelia	+						—											
Acanthospermum lecocarpoides											+							
microcarpum						+												
Ageratum latifolium						+	—											
Aplopappus lanatus	—																	
Baccharis pilularis						—												
Pingraea, var. angustissima			+															
Steetzii						+												
Bidens chilensis			+															
pilosa			—			—	+											
refracta			+			+					+		+		+			
Blainvillea rhomboidea			+	+		+	+		+		+	+	+		+	+		
tenuicaulis			—			—												
Brickellia diffusa			+															
Chrysanthellum erectum						+	+					+			+			
pusillum			—			+	—											
Eclipta erecta						+	+				+							
Elvira inelegans						—												
repens			+										+					
Encelia hispida						—	+											
Erigeron lancifolius			+												+			
linifolius						+												
tenuifolius		+	+			—			+				+					
sp.						+												
Eupatorium filicaule			+															
sp.?						—												
Flaveria Contrayerba						—												
Hemizonia squalida	—																	
Jaegeria gracilis						—												
prorepens													—					
Lecocarpus foliosus						+												
Lipochaeta laricifolia		+	+			+	+								+			
Pectis Anderssonii												+						
Hookeri			—	+		—					+		+	+		+		
linifolia							—					—				+		
subsquarrosa							—											
tenuifolia			+			+	+					+				+		
Porophyllum ellipticum		+	+			+	+		+		+	+	+	+				
Scalesia affinis						—												
aspera												+						
atractyloides	—																	
Baurii									+									
var. glabrata									+									

TABLE II.—*continued.*

	Galapagos Ids.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Scalesia Darwinii					+								−					
decurrens			−		+													
divisa						+												
gummifera			+															
Helleri				+														
Hopkinsii		+																
incisa						−												
microcephala			+												+			
narbonensis															+			
ovata					+													
pedunculata													−					
retroflexa												−						
Snodgrassii																		+
n. sp.?			+															
Sonchus oleraceus			+		+													
Spilanthes Acmella					−										+			
diffusa					−								−					
Tagetes erecta						−												

General Features of the Flora.

The habital traits of the vegetation on the Galapagos Islands have been graphically although rather gloomily pictured by Darwin (2), 140, and by Wolf (1), 277. A. Agassiz (1), 57–62, and Baur, who visited the islands at a more favorable season, describe the flora as somewhat more luxuriant. The lower slopes of all the islands, however, are relatively sterile, arid, and rough, much of the surface being covered with irregular blocks of lava. The air, although not excessively hot, is very dry. Trade winds are said to be moderate in force, but almost constant. The perennial vegetation of these lower parts of the islands is predominatingly of a small-leaved xerophytic type, being composed of scattered and often sparse, stemmy shrubs and undershrubs, or wiry herbs and grasses, over which rise the bulky and grotesque trunks of arborescent species of *Cereus* and *Opuntia*. On those islands, which, like Gardner, Hood, Tower, and Bindloe, are entirely low, not attaining an altitude of 300 m., this is the only kind of perennial vegetation, except a few halophytes along the shores. On the higher islands, however, like Albemarle, Charles, Chatham, James, and Indefatigable, the upper parts

penetrate higher, moister strata of the air, and support a much more luxuriant vegetation of a mesophytic type. Between these chief types of vegetation there are perceptible but ill-defined belts of an intermediate nature. A few lakes and ponds, some muddy and others briny, support a littoral vegetation, chiefly of *Cyperaceae*, a family represented by seventeen species and varieties of *Cyperus* and one or two each of *Dichronema*, *Eleocharis*, *Fimbristylis*, *Hemicarpha*, *Kyllinga*, and *Scleria*. A cold spring on Charles Island contains an *Azolla* (Andersson), and in a small brook on the same island a *Salvinia*, a *Callitriche*, and a *Lemna* have been found (Wolf); but as both springs and streams are rare and small, such true hydrophytes are few and relatively unimportant in the archipelago. Halophytes are more abundant, and occur not only on the sandy beaches in the brackish marshes along the shore, but to some extent around the saline lakes of the interior portions of the islands. The chief halophytes are *Cissampelos Pareira*, *Tephrosia cinerea*, *Rhizophora Mangle*, *Laguncularia racemosa*, *Sesuvium Portulacastrum*, *S. Edmonstonei*, *Calystegia Soldanella*, *Ipomoea biloba*, *I. Habeliana*, *Batis maritima*, *Avicennia officinalis*, *Verbena litoralis*, *Heliotropium curassavicum*, *Scaevola Lobelia*, *Ruppia maritima*, *Najas marina*, var. *latifolia*, and probably *Thinogeton Miersii*, *T. Hookeri*, and two undetermined species of *Atriplex*.

The lower arid slopes support not only the stemmy, suffrutescent vegetation described above, but also are covered from time to time by an ephemeral growth of desert annuals, which spring up shortly after the rainy season begins, mature rapidly, and quickly dry up completely. Examples of this type of plants are found in *Porophyllum ellipticum*, *Evolvulus simplex*, and several species of *Boerhaavia*, *Kallstroemia*, *Tribulus*, and *Bidens*.

Trees, if we except the arborescent cacti, occur chiefly upon the upper parts of the islands and never attain great size. In many cases, however, the same species which form a tree-like growth in the upper region extend well into the lower or even to the shore as shrubs, stunted by the extreme drought and sterility of their environment. The trees and shrubs are in great part armed with spines or thorns, e. g. *Mimosa*, *Acacia*, *Parkinsonia*, *Discaria*, *Castela*, *Zanthoxylum*, *Cereus*, and *Opuntia*, — genera, all of which, it will be noticed, belong to the choripetalous dicotyledons. On the other hand, species protected by poisonous juices or stinging hairs appear to be few. The climbing plants of the islands are chiefly of the genera *Boussingaultia*, *Cissampelos*, *Galactea*, *Rhynchosia*, *Cardiospermum*, *Ipomoea*, *Elaterium*, *Momordica*, and *Sicyos*.

They are neither so numerous nor conspicuous as in the tropical parts of continental America, and it may be noticed that the climbers of the Galapagos Islands are herbaceous, the true woody liana, so common in tropical jungles, being almost unknown upon these islands.

Epiphytes occur only at the higher altitudes and are neither abundant nor showy. Their ecological class is chiefly represented by one *Tillandsia*, one *Epidendrum*, and several *Peperomiae*. Of phanerogamic parasites there are four species of *Phoradendron* and two of *Cuscuta*.

The phanerogams of the Galapagos Islands have prevailingly small and inconspicuous flowers, although exceptions are not infrequent. It is also worthy of remark that the flowers are in most cases regular and of a rather simple structure. Zygomorphic flowers are not numerous, and even in such genera as *Epidendrum*, *Salvia*, etc., where zygomorphy is universal, the Galapageian species show this trait only moderately developed. Similarly, flowers with other highly developed mechanisms for securing cross-pollination seem to be very rare in the islands. Fruits with hook apparatus or spines to aid their distribution by mammals are found in *Cenchrus*, *Tribulus*, *Acanthospermum*, *Bidens*, and *Lecocarpus*; but by the decided reduction in the spines of most of the species of *Cenchrus*, and in a variety of *Tribulus cistoides*, as well as in *Acanthospermum microcarpum*, it is easy to remark a tendency toward abortion in this apparatus, — a fact readily explained by the paucity of indigenous mammals. Of course the settlement of the islands has brought introduced mammals in considerable quantity, but it is too recent to have had a perceptible influence in this matter.

Affinities of the Flora.

The flora of the Galapagos Islands is almost wholly American in character. It contains, it is true, a very few plants which are not found in America. Thus a slight relationship to the flora of the Hawaiian Islands might be inferred from the genus *Lipochaeta*, of which one species is Galapageian and the others Hawaiian. There is also a report of a *Vigna* common to the Hawaiian Islands, the Galapagos, and Chili, — a matter which I have been unable to verify. *Ipomoea campanulata* of the East Indies and Malayan Archipelago occurs on the Galapagos Islands, but not to my knowledge upon the continent of America. This is probably a chance introduction. Several species of the Old World, such as *Vitis vinifera*, mentioned by Caruel (1), 623, *Brassica campestris*, *B. Sinapistrum*, and *Raphanus sativus*, are of course relics of cultivation or introduced weeds. *Eleocharis fistulosa*, ascribed by Caruel

(1), 622, to Chatham Island, is with scarcely a doubt an erroneous determination.

While it is thus clear that the Galapageian flora is only an outlying portion of the American flora with a strong specific differentiation, it is impossible to trace its relationship closely to any one section of the Pacific American vegetation. It can only be said in a general way that nearly all the plants of the archipelago are identical with, or obviously related to, species of the Sierras and Andes or of the Pacific Slope between Lower California on the one hand and northern Chili on the other. The xerophytic elements in the Galapageian flora show a considerable resemblance to the desert flora of southern Peru and the drier parts of the Andes. The mesophytes, on the other hand, correspond most nearly to plants of Ecuador, Colombia, Central America, and southern Mexico.

Those who have written upon the phytogeography of the Galapagos Islands have frequently mentioned the West Indian affinities of the flora, but here I can find no close resemblance or significant relationship. It is to be noticed that Hooker, who first employed the term "West Indian" regarding the flora of the Galapagos Islands, either used it to include, or expressly qualified it by the addition of, the flora of Panama and the adjacent lowlands of the continent, — a qualification which has not always been sufficiently regarded by subsequent authors. But, on the other hand, the discoveries of the last half century have shown a much greater difference between the flora of the Antilles and of the Panama region than was to be inferred when Hooker wrote; so although a definite relationship can be traced between the Galapageian flora and that of the lower slopes of Colombia, it does not follow that there is any marked affinity to the flora of the West Indian Islands. Indeed, of the species common to the Galapagos and the Antilles there are none (if we except a sterile and doubtfully identified specimen of the Cuban *Cenchrus distichophyllus*) which do not also occur upon the adjacent parts of the continent, and nearly all, like the halophytes of the shores, are species of wide tropical distribution.

Hooker (4), 239, 250, drew attention to what appeared to be an interesting double relationship between the plants of the Galapagos Islands and those of other regions, as follows: "Here, as in other countries, the vegetation is formed of two classes of plants, — the one peculiar to the group, the other identical with what are found elsewhere. In this there are even indications of the presence of two nearly equal Floras, — an indigenous and introduced, — and these are of a somewhat different stamp;

for the introduced species are for the most part the plants of the West Indian Islands and of the lower hot parts of the South American coast, whilst the peculiar Flora is chiefly made up of species not allied to the introduced, but to the vegetation which occurs in the Cordillera or the extra-tropical parts of America." But, after repeated efforts, I am unable to verify this double relationship, and must infer that subsequent discoveries, both upon the mainland and upon the islands, have done much to weaken the grounds upon which these conclusions once rested. Many cases could now be cited to show that the endemic plants of the Galapagos Islands, far from forming a marked or peculiar class, are often the nearest allies of species or varieties which are common to the islands and the continent. Both classes include alike the most widely diverse elements, — xerophytic, mesophytic, and halophytic types, annuals and perennials, herbs, shrubs, and trees, climbers and epiphytes, — and both occur in common at all altitudes and in every sort of habitat the islands afford. Accordingly it is not remarkable to find their closest congeners occupying the same diverse habitats upon the mainland from the hot, moist lowlands about Guayaquil and Panama to the cool parts of the Andes, dry regions of Peru or western Mexico, and in a few instances the more fertile uplands of Colombia, Central America, and Mexico. Moreover, the endemic forms show all grades of differentiation from their continental allies; some are well marked specific types, others mere varieties, while still others are scarcely distinguishable forms.

It appears, therefore, that very diverse floral elements have reached the archipelago, probably at different times and from widely different habitats. Presumably all have been subjected on the islands to influences of a kind to bring about change in their nature; and in two-fifths of the plants now known on the islands more or less pronounced evidences of such change can be observed. These plants, which show modification, form, as we have seen, no sharply marked class, but pass over very imperceptibly into nearly related forms which it is impossible to differentiate from plants of the mainland. That some plants have reached the Galapagos from the West Indian Islands during the subsidence of the Isthmus of Panama is by no means impossible, but as we should expect, these plants, if such there were, have established themselves in like manner upon the western coast and slopes of the continent, so that it is now quite impossible to trace any direct floral affinity between the West Indies and the Galapagos which the latter do not exhibit even in a higher degree with the western parts of the mainland.

Mr. Hemsley has already commented upon the wide divergence be-

tween the flora of the Galapagos group and that of Cocos Island. The latter is situated about three-sevenths of the way from the coast of Costa Rica to the Galapagos Archipelago. Until very recently the flora of Cocos Island has been scarcely known at all. Largely through the efforts of Professor H. Pittier and Messrs. Snodgrass & Heller, about eighty plants have now been secured on the island, and of these only the following eighteen are common to the flora of the Galapagos group:

Plagiochila Anderssonii
Acrostichum aureum
Asplenium rhizophyllum
Nephrolepis acuta
Polypodium aureum
Polypodium lanceolatum
Polypodium Phyllitidis
Eleusine indica
Panicum sanguinale
Paspalum conjugatum
Paspalum distichum
Caesalpinia Bonducella
Euphorbia pilulifera
Ricinus communis
Hibiscus tileaceus
Ipomoea biloba
Ipomoea Bona-nox.

It will be noticed that with the exception of the hepatic (*Plagiochila Anderssonii*) all of these species are weeds or plants of wide tropical distribution.

Composition of the Flora.

As with most insular floras, the vegetation of the Galapagos Islands is striking rather by the absence of certain great groups than by the number and diversity of the genera and families represented. For instance, in the pteridophytes there is a total lack of arborescent forms on the one hand and of the filmy ferns (*Trichomanes*, *Hymenophyllum*, etc.) on the other. There are no gymnosperms; and among the monocotyledons there are no palms, aroids, rushes, or *Liliaceae*. Indeed, if we except the grasses and sedges (both well represented), the monocotyledons are shown only by some half-dozen scattered species. Among the dicotyledons the families best represented are the *Amarantaceae*, *Nyctaginaceae*, *Aizoaceae*, *Leguminosae* (about 10 per cent of the phanerogamic vegetation), *Euphorbiaceae* (about 12 per cent), *Malvaceae*, *Cactaceae*, *Convolvulaceae*, *Boraginaceae*, *Verbenaceae*, *Labiatae*, *Solanaceae*, *Rubiaceae*, and *Compositae* (about 13.5 per cent). Several great dicotyledonous families, widely distributed and abundant in the tropics of continental America, such as the *Sapindaceae*, *Myrtaceae*, *Melastomaceae*, *Lythraceae*, and *Onagraceae*, are scarcely or not at all represented in the

flora of the archipelago. Altogether there have been 72 families[1] of flowering plants and ferns found on the islands. Of these families 39 include endemic forms, and 33 contain only plants common to other regions. Excluding some indeterminate forms, there are 232 genera of pteridophytes and spermatophytes upon the islands.

Notwithstanding the uncertainty with which some plants are here reckoned as species, and others as varieties or forms, the following figures regarding the plants of the Galapagos Islands will have an interest:

	Species.	Varieties.	Forms.	Indeterminate.	Total.
Ferns	52	2	0	1	55
Fern-allies	2	0	0	2	4
Pteridophytes	54	2	0	3	59
Spermatophytes	445	17	19	50	531
Vascular plants	499	19	19	53	590

1239

Of endemic ferns there are only 3, that is, but 5 per cent. Of endemic spermatophytes there are 202 species, 15 varieties, and 19 forms, — a total of 236, that is, 44.4 per cent of the whole flowering flora. The total number of vascular plants which are endemic is 239, or 40.5 per cent. Of these endemic plants 130, that is, more than half, are confined to a single island.

The ratio of (determined) species to genera is as 2.16 : 1.

The ratio of species, varieties, and forms to genera is as 2.55 : 1.

It is noteworthy that, although there is such a high percentage of peculiar forms, varieties, and species, there is no corresponding peculiarity among the genera of these islands.[2] Of the several genera which have from time to time been characterized as exclusively Galapageian, only two, *Scalesia* and *Lecocarpus*, are now maintained, while all the others have been reduced to genera of continental America, with the single exception of *Macraea*, which falls into a genus of the Hawaiian Islands. Even *Scalesia* is not a strong genus, as it is not easy to show very sharp generic distinctions between it and some allied *Helianthoideae* in Mexico and Central America.

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[1] This does not include the *Rosaceae* and *Bignoniaceae*, which rest, so far as their Galapageian occurrence is concerned, upon single and doubtful determinations.

[2] The statement of Darwin (2), 165, regarding the genera of *Compositae*, is, as pointed out by Mr. Hemsley, quite erroneous, and must have rested upon some misapprehension of data furnished him.

Families containing Vascular Plants peculiar to the Islands.

Family.	Endemic species.	Endemic varieties.	Endemic forms.	Total.
Filices	3	0	0	3
Gramineae	13	1	0	14
Cyperaceae	4	1	0	5
Bromeliaceae	1	0	0	1
Orchidaceae	1	0	0	1
Piperaceae	5	0	0	5
Urticaceae	1	0	0	1
Loranthaceae	4	0	0	4
Polygonaceae	1	0	0	1
Amarantaceae	29	1	2	32
Nyctaginaceae	1	0	0	1
Aizoaceae	4	1	0	5
Leguminosae	6	0	0	6
Oxalidaceae	1	0	0	1
Zygophyllaceae	2	1	0	3
Simarubaceae	1	0	6	7
Burseraceae	1	0	0	1
Polygalaceae	2	1	0	3
Euphorbiaceae	25	7	7	39
Celastraceae	1	0	0	1
Sapindaceae	1	0	0	1
Malvaceae	3	0	0	3
Sterculiaceae	1	0	3	4
Passifloraceae	2	0	0	2
Cactaceae	7	0	0	7
Myrtaceae	1	0	0	1
Melastomaceae	1	0	0	1
Umbelliferae	1	0	0	1
Apocynaceae	1	0	0	1
Asclepiadaceae	1	0	0	1
Convolvulaceae	8	0	0	8
Boraginaceae	12	1	0	13
Verbenaceae	4	0	0	4
Labiatae	2	0	0	2
Solanaceae	5	0	0	5
Acanthaceae	1	0	0	1
Rubiaceae	16	0	1	17
Cucurbitaceae	2	0	0	2
Compositae	39	1	0	40

Abingdon Island.

Abingdon is, with the exception of the rather remote islets of Wenman and Culpepper, the most northern of the archipelago. It is about 14 km. long, and attains a height of 600 m. It was visited by Dr. Baur for a few hours, September 8th, 1891, and by Messrs. Snodgrass and Heller in June, 1899. Fifty flowering plants and ferns are known to occur on the island, and of these four are peculiar to it, namely: *Euphorbia viminea*, var. *abingdonensis*, *Borreria ovalis*, forma *abingdonensis*, *Justicia galapagana* (with close Mexican congener), and *Scalesia Hopkinsii*. The peculiar element is thus 8 per cent of the flora. *Peperomia galioides* of Mexico and tropical South America occurs upon Abingdon, but upon no other of the Galapagos Islands. The remaining plants are common to other islands of the group, and represent in all 22 families, of which the *Filices*, *Gramineae*, *Rubiaceae*, *Euphorbiaceae*, and *Compositae* have the greatest number of species. Although Abingdon lies, as we have seen, to the northward of the main archipelago and on the side toward Wenman and Culpepper, it has, so far as we yet know, only one plant in common with the former and none with the latter. A little over half

the flora of Abingdon is exclusively Galapageian, and the common element is greatest with Charles, Albemarle, and Chatham Islands.

Albemarle Island.

Albemarle is the largest island of the archipelago, and extends through about one and a quarter degrees of latitude. It is L-shaped and crossed by the equator near its northern extremity. There are many craters upon it, some of them having been active within historic times. The five largest range from 770 to 1570 m. in height. The island seems to have been explored chiefly if not exclusively along its western shore, the greater part of the plants collected upon it having been secured about Iguana Cove, Point Christopher, Elizabeth Bay, Tagus Cove, Banks Cove, and Black Bight. The island was first visited for botanical purposes by Macrae (whose name is also written McRae), a Scotch gardener, sent by the London Horticultural Society, on the voyage of the "Blonde," when in 1825 that vessel, under the command of the seventh Lord Byron, conveyed back from England the king and queen of the Sandwich Islands. Macrae remained eight days upon the island, and collected there 41 different kinds of plants. Albemarle has since been visited for botanical purposes by Darwin, Andersson, the Hassler Expedition, Wolf, Lee, Baur, Snodgrass and Heller. The broad southern portion of the island is relatively well watered and possesses a rich and copious vegetation, while the northern parts are described by Darwin as miserably sterile — an account to a great extent confirmed even by those who have visited the island at a more favorable season. In all 205 flowering plants and ferns have been found on Albemarle, and of these, 17 are to our present knowledge confined to this island. Thus the peculiar element (about 8 per cent) is less than that of any of the other large islands. Among the noteworthy plants of Albemarle are a well marked and apparently abundant *Scalesia* (*S. gummifera*) confined to the island, and the problematic *Pleuropetalum Darwinii*, which elsewhere occurs only upon James Island, although close congeners are found in Ecuador and Costa Rica. The different plant families occurring on Albemarle are represented in about the proportion in which they occur in the whole archipelago. Of the species of Albemarle nearly half are common to Charles and Chatham, and about one-third to James, while scarcely more than one-fifth have been found on Indefatigable, although it attains about the same height and lies directly between Albemarle and Chatham.

Barrington Island.

Barrington is a small island about 8 km. long, lying between Indefatigable and Chatham. It rises only 277 m. above sea-level, and possesses only a xerophytic type of vegetation, with no ferns, no sedges, no *Piperaceae*, and only two *Leguminosae*. The island has been visited by Dr. Baur and by Messrs. Snodgrass and Heller, but only 39 plants have been secured there. Of these but one *Scalesia* is confined to the island. The thorny *Discaria*, the *Scalesia*, just mentioned, *Croton Scouleri*, *Cordia lutea*, *C. Hookeriana*, and *Maytenus obovata*, together with a large and abundant *Opuntia*, are its shrubby and arborescent species, the other plants being herbs of a decidedly xerophytic type, grasses and *Euphorbiaceae* predominating as to number. Of its 40 species, 26 occur upon Charles and Chatham Islands, while but 18 have been found on the nearer Indefatigable. *Leptochloa mucronata* of South America, collected on Barrington, is not known to occur on any of the other islands of the archipelago.

Bindloe Island.

Bindloe lies with Abingdon and Tower to the northward of the other chief islands. It is roughly elliptical and about 15 km. long, rising to a height of only 250 m. It appears to have been visited for botanical purposes only by Dr. Baur, 4–5 September, 1891, and Messrs. Snodgrass and Heller, 29 June, 1899. Only 42 different plants have been collected or recorded there, and only 1, a mere leaf form of *Castela galapageia*, is peculiar to the island, although the continental *Canavallia obtusifolia*, found upon Bindloe, has as yet been collected upon none of the other islands. Messrs. Snodgrass and Heller report a gigantic *Cereus* as rare on Bindloe; only one individual was seen. The *Opuntia* of Bindloe is low, only 3 to 9 dm. in height. More than half the plants of Bindloe occur upon Charles, Chatham, and Albemarle respectively, while the proportion found on Abingdon and Tower is considerably less, and but a single plant of Bindloe has been found on Culpepper and Wenman.

Brattle Island.

Brattle is a small islet close to the southeastern shore of Albemarle. It forms, according to Dr. Baur, the remains of a single volcano, the southeast part of which has been nearly destroyed. The island has never been botanically explored. Dr. Baur made repeated efforts to land upon it, but was baffled by the precipitous shores. From his

account (2), 236, we learn that the island is green as though covered with vegetation, that many ravines run down from the upper part, and that it is the breeding place for numerous sea-birds. Messrs. Snodgrass and Heller sailed within a few hundred yards of Brattle and report it a low, steep, and sterile rim of a tufa crater, the only vegetation being a scattering growth of *Croton* bushes.

Grossman Islands are similar small rocky islets, on which no plants have been observed.

Charles or Floriana Island.

Charles is one of the five larger and higher islands, and with the possible exception of Chatham has been the most fully explored botanically. It has yielded the largest number of plants, namely, 267. Of these 33 are peculiar to it, and 105 to the archipelago. Charles was at one time inhabited by a penal colony from Ecuador, and in its flora shows a greater number of obviously introduced plants than are found on any of the other islands except Chatham. Of the 267 plants found on Charles 126 occur also on Chatham and 100 on Albemarle. According to Baur (2), 239, the appearance of Charles is quite different from that of Chatham, the hills being more rounded. He also states that there are no large forest trees on Charles. The desolate coast of Charles at Black Beach is figured by Agassiz (1), t. 19, 20, and the copious vegetation on the way to the hacienda, t. 21.

Chatham Island.

Chatham being the most easterly of the islands, is of course the nearest to the mainland. It is relatively large and fertile, and the only one of the group which is now inhabited. Portions of it are covered by forests of large trees, and in other parts are high arable plains, well shown by Agassiz (1), t. 17. When Baur visited the island in 1891, he found two hundred and ten acres under cultivation. The plantations are owned by Mr. Cobos, to whose courtesy and hospitality the visiting naturalists have been repeatedly indebted. Chatham has been relatively well explored, 231 plants having been found upon it. Of these, 24 are peculiar to it, and 82 exclusively Galapageian. Notwithstanding the habital differences spoken of by Baur (2), 230, the flora of Chatham possesses the largest common element with that of Charles. A giant cactus (*Cereus sclerocarpus*?) with red egg-shaped fruit is mentioned by Baur. This is doubtless the one which appears in Agassiz's Plate 16.

Culpepper Island.

Culpepper is a small barren islet, the most northern member of the archipelago. It is remote from all the other islands except the similar islet, Wenman. Culpepper rises precipitously from the sea, and attains an altitude of only 169 m. It has been visited for botanical purposes only by Messrs. Snodgrass and Heller, on December 10th, 1898. They report that the main part of the island is inaccessible. It is a gently rounded plateau falling off abruptly on all sides. Observed from below, it was seen to be covered with a fairly dense growth of vegetation, including *Croton* bushes and *Opuntia* thickets. Only 4 plants were secured, and these were gathered on a short strip of talus at the base of the cliffs, on the leeward side of the island. They were *Telanthera Helleri* (the most abundant species seen), a sterile and indeterminate *Tribulus*, *Croton Scouleri*, var. *brevifolius*, and *Thinogeton Miersii*. With the probable exception of the *Tribulus*, all these are confined to the Galapagos Islands, and the *Telanthera* is a marked new species, which in its typical form has been found only upon Culpepper, although a form of the same plant was also collected on Wenman.

Duncan Island.

Duncan is a small low circular island, between Indefatigable and Albemarle. Plants have been collected upon it by Mr. Alexander Agassiz early in April, 1891; Dr. Baur, 2 August, 1891; and Messrs. Snodgrass and Heller, 5 May, 1899. Altogether 51 different species have been secured upon the island; of these, 5 are peculiar to it, namely: *Castela galapageia*, forma *duncanensis*, *Verbena grisea*, *Borreria galapageia*, *Scalesia Baurii*, and its var. *glabrata*. About half the flora of Duncan is exclusively Galapageian. The *Opuntia* on this island is said to be scattered and of large size, growing upon the rim of the crater. *Rhizophora Mangle* occurs in a small swamp upon the west coast. It is another of the unaccountable anomalies in the florulae of these islands that the common element between Duncan and Charles or Chatham is greater than between Duncan and the nearer islands of Albemarle, Indefatigable, and James.

Gardner Island.

Gardner is a very small steep-shored island about 1 km. in length, and only 8 km. east of Charles Island. It attains an altitude of 240 m. It was visited by Dr. Baur in July, 1891, and by Messrs. Snodgrass and

Heller in May, 1899. Thirty-three plants have been found on it, including 4 grasses, 3 *Euphorbiaceae*, and 3 *Malvaceae*, but no ferns, no *Rubiaceae*, and no *Compositae*. Gardner is the only one of the Galapagos Islands which on botanical exploration has yielded no peculiar plant. Baur (2), 233, speaks of the flora of Gardner as being the same as that of Hood, and doubtless there is great habital similarity, but of the 33 plants known to grow on Gardner, only 22 have been found on Hood, while no less than 31 have been observed on Charles.

Hood Island.

Hood is a desert island of elliptical form, lying to the southeast of the other islands. It is nearest Chatham, Barrington, Gardner, and Charles. According to Dr. Baur, it is a low tableland with few peaks, the highest only 200 m. in altitude, and thus still wholly within the lower dry strata of the atmosphere. There are no trees of size on Hood, and the ground is strewn with large angular masses of rock. Dr. Baur states that cacti are here less abundant than on the other islands, and that the *Opuntia* is short and thick-stemmed. Hood Island has also been visited for botanical purposes by Dr. Habel, Professor Lee, and by Messrs. Snodgrass and Heller. Altogether 55 different plants are known to occur on the island; of these only two are peculiar to it, namely: *Amaranthus sclerantoides*, forma *hoodensis*, a mere leaf form, and *Acanthospermum lecocarpoides*, a well marked species. Of the plants of Hood, 20, or about 36 per cent, are peculiar Galapageian forms. There are no ferns, 8 grasses, 7 *Leguminosae* (including the Brazilian *Geoffraea superba*, not collected elsewhere in the Galapagos), 5 *Convolvulaceae*, 5 *Boraginaceae*, and 6 *Compositae*. There are no *Rubiaceae* and only 3 *Euphorbiaceae*. About three-fourths of the plants of Hood are also found on the lower arid slopes of Charles and Chatham Islands, while only about one-third of them have been observed on Indefatigable.

Indefatigable Island.

Indefatigable is one of the larger islands, and is centrally situated in the archipelago. It is broadly elliptical, some 32 km. in diameter, and formed of a single, rather symmetrical volcanic mountain, rising to a considerable height. In the basin of the cone is a large area of well-watered land, which, according to Captain Tanner, possesses considerable natural resources. Indefatigable was first explored botanically by Andersson, who could, however, spend only a few hours upon it. It has

been subsequently visited by Dr. Habel, the Hassler Expedition, Dr. Wolf, Dr. Baur, 11 to 13 July, 1891, and Messrs. Snodgrass and Heller. Altogether 76 flowering plants have been found on the island. Of these, 8 are *Compositae*, 7 *Boraginaceae*, 7 grasses, and 5 *Amarantaceae*. Nine species and one form are peculiar to the island. Among these are two species of *Scalesia*, and two of *Borreria*. The vegetation so far as yet shown is of a more xerophytic cast than that of the other large islands, although it is to be suspected that this is due to imperfect exploration. Perhaps the most striking feature is the entire absence of ferns. The genus *Croton*, also, although one of the commonest and most widely distributed in the Galapagos, has not been collected or reported upon Indefatigable. Of the 76 plants known to occur on this island, 51 have been found on Chatham, 48 on Charles, and 46 on Albemarle.

James Island.

James is also one of the larger, higher, and more central islands. It has been visited by most of the expeditions which have explored the archipelago, and 153 plants have been collected upon it. Of these 19 are peculiar to the island, and 56 to the archipelago. The most noteworthy feature is the relative abundance of ferns, which here amount to 13 per cent of the whole vascular vegetation, — a striking contrast to their entire absence on the adjacent Indefatigable. The nearest affinities of the flora of James are with Charles, Albemarle, and Chatham.

Jervis Island.

Jervis Island is less than 3 km. long and of low altitude. It is but 9.6 km. south of James, and together with Duncan lies in a small portion of the ocean to a considerable extent inclosed by James, Albemarle, and Indefatigable islands. It was visited by the "Hassler," but so far as I can learn, only Dr. Baur has collected plants upon this island. He secured 22 different kinds, of which 2, *Euphorbia viminea*, forma *jervensis*, and *Castela galapageia*, forma *jervensis*, are foliar forms of species which in slightly different forms are rather widely distributed on the islands. It is a curious fact that of the 22 plants observed on this island only 9 have been found on the adjacent James Island, although 12 have been collected upon Chatham, and no less than 15 on Charles, both much more distant. Fourteen, or about two-thirds, of the plants of Jervis are confined to the Galapagos Archipelago.

Narborough Island.

In proportion to its size and interest Narborough has received the least botanical attention of any of the islands. This is to be regretted, as it is not only the most remote from the mainland, but is much shielded by the neighboring long and lunate island Albemarle from any direct drift from the other islands or from the continental coast. Although it is to be expected that Narborough would on this account possess a decidedly peculiar flora, the single collection made there by Messrs. Snodgrass and Heller and including 59 different plants, contains only 4 species confined to the island and only 26 which are confined to the archipelago. Thus the percentage of peculiar and strictly Galapageian plants is less rather than more than on the other large islands. This lack of peculiarity may well be due to recent volcanic activity on Narborough, since this would tend to impoverish the flora except as it was replaced by recent immigration from the other islands.

The Seymour Islands.

North and South Seymour are two islets lying just north of Indefatigable, from which they are separated by channels only 1 or 2 km. broad. They are of relatively low altitude. South Seymour is somewhat larger than North Seymour and lies directly between it and Indefatigable. The Seymour Islands have been visited for botanical purposes only by Messrs. Snodgrass and Heller, who collected upon the north island 18 plants and on the south 34. As upon the adjacent Indefatigable no ferns have been found on the Seymour Islands. On South Seymour there are 2 endemic species not known to occur upon the other islands, namely, *Bursera malacophylla* and *Euphorbia nesiotica*, while North Seymour has an as yet indeterminate plant (*Nyctaginacea?*) which may well prove peculiar to it. It is noteworthy that less than half the plants of the Seymour Islands have as yet been found upon Indefatigable, near as it is ; indeed the common element is considerably greater with the much more distant islands of Charles, Chatham, and Albemarle. Halophytes form a noteworthy part of the vegetation of the Seymour Islands.

Tower Island.

Tower is a small triangular island some 3 km. in breadth. It lies at the northeast of the main archipelago and is nearest Bindloe, which is

about 50 km. away. Tower rises only 65 m. above sea level. It has been visited by Dr. Baur, 2 September, 1891, and by Messrs. Snodgrass and Heller, June, 1899, who have together secured only 19 different kinds of plants upon it. Of these, 5 are *Euphorbiaceae*, and 3, *Convolvulaceae*. There are no ferns, and what is more remarkable, no *Amarantaceae*, *Leguminosae*, *Rubiaceae*, or *Compositae*, all of which are families exceptionally well represented upon most of the other islands. The only plant peculiar to the island is *Euphorbia viminea*, forma *castellana*, merely a well marked leaf-form of this polymorphous species. It is worthy of note, however, that in the size, shape, and thickness of its leaves, this form on Tower represents the opposite extreme from the variety of the same species found on the adjacent island of Abingdon. Eleven of the 19 plants observed on Tower are confined to the Galapagos Islands.

Wenman Island.

Wenman is a rocky islet, which, like Culpepper (43 km. distant), lies considerably to the northward of the other islands. For botanical purposes it has been visited only by Messrs. Snodgrass and Heller, who remained there from the 12th to the 18th of December, 1898. Mr. Heller's field notes, so far as they relate to plants, are as follows: "The main part of the island is largely inaccessible, but, like Culpepper, covered with a fair growth of vegetation. Through a glass the larger plants appeared to be *Croton*, *Opuntia*, and on the north side a cluster of leafless trees, each about a foot in diameter and twenty to thirty feet high, with a smooth brownish bark. In an inaccessible cave a *Polypodium* was seen. Our collecting was confined chiefly to a low detached islet north of the main island. Its vegetation consisted of a low *Opuntia* [*Helleri*], which grew in thick beds near the edges of the cliffs. Many of these were covered with greenish-yellow flowers and others with dry and prickly fruit. The central part of the islet was covered by a heavy growth of *Croton* [*Scouleri*, var. *brevifolius*] bushes. These were largely leafless, although a few were in flower. In habit they resembled saplings, with straight trunks ten feet high and an inch or two thick. An *Ipomoea* [*Kinbergi*] was common, twining among the *Croton* bushes. This had large white flowers. A *Telanthera* [*Helleri*, var. *obtusior*] was also common about the cliffs and near the *Opuntia* thickets. Dried stalks of a *Cyperus* were noted. On a talus slope of the main island the following species were collected: *Scalesia* [*Snodgrassii*], bushes two or

three feet high, with a thick head of leaves and flowers ; *Cardiospermum* [*Corindum*] a few vines, also an *Atriplex* [undetermined] fairly common." Altogether eleven species were collected on Wenman and the detached islet. Of these three are new and peculiar, three Galapageian occurring also upon other members of the group, two common to the mainland, and three not fully determined.

TABLE III. — Summary of Florulae.

(Relating exclusively to the Pteridophytes and Spermatophytes.)

Island.	Species, varieties, and forms on island.	Peculiar to island.	Per cent peculiar to island.	Peaculir to archi-pelago.	Per cent peculiar to archi-pelago.	Common to other regions.	Per cent common to other regions.
Abingdon . .	50	4	8	26	52	24	48
Albemarle . .	205	17	8	84	41	120	59
Barrington . .	40	1	2.5	19	48	21	52
Bindloe	42	1	2.4	19	45	23	55
Charles	267	33	12	105	39	162	61
Chatham . . .	231	24	10	82	42	149	58
Culpepper . .	5	1	20	3	60	2	40
Duncan	51	5	10	25	49	26	51
Gardner . . .	33	0	0	15	45	19	55
Hood	59	2	3.4	20	34	35	66
Indefatigable.	76	10	13	35	47	41	53
James	153	19	12	56	37	97	63
Jervis	22	2	9	16	73	6	27
Narborough .	59	4	7	26	44	33	56
Seymour . . .	47	2	4	16	34	29	66
Tower	19	1	5	11	58	9	42
Wenman . . .	11	2	18	5	45	6	55

TABLE IV.—Pteridophytes and Spermatophytes Common to the Different Islands.

Island.	Abingdon.	Albemarle.	Barrington.	Bindloe.	Charles.	Chatham.	Culpepper.	Duncan.	Gardner.	Hood.	Indefatigable.	James.	Jervis.	Narborough.	Seymour.	Tower.	Wenman.
Abingdon . .	50	34	11	15	36	31	0	10	13	14	18	26	9	14	7	11	1
Albemarle . .	. .	205	23	24	100	93	2	29	17	33	46	74	13	42	25	7	2
Barrington . .	. .	. .	40	11	26	26	2	13	14	20	18	19	5	15	16	10	0
Bindloe	. .	. .	. .	42	25	22	1	7	8	13	15	14	5	15	8	9	1
Charles	. .	. .	. .	. .	267	126	2	35	31	40	48	78	19	38	30	13	2
Chatham . . .	. .	. .	. .	. .	. .	231	2	34	22	42	51	64	12	33	31	15	4
Culpepper . .	. .	. .	. .	. .	. .	. .	5	2	1	2	0	0	0	2	2	1	1
Duncan	. .	. .	. .	. .	. .	. .	. .	51	17	26	20	21	8	9	16	7	1
Gardner . . .	. .	. .	. .	. .	. .	. .	. .	. .	33	22	17	15	6	7	13	9	1
Hood	. .	. .	. .	. .	. .	. .	. .	. .	. .	59	20	29	8	15	20	10	0
Indefatigable	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	76	33	12	14	23	9	2
James.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	153	10	27	19	10	1
Jervis	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	22	1	7	3	1
Narborough .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	59	8	7	0
Seymour . . .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	47	6	2
Tower	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	19	2
Wenman . . .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	. .	11

Botanical Evidence regarding the Origin of the Galapagos Islands.

Two views have been advanced regarding the origin of the Galapagos Islands. According to the first they are pelagic islands, built up from the sea-floor by volcanic action, while according to the second view they are continental islands, tops of mountains, formerly a part of the mainland, now separated from it by subsidence. The first view, namely, that the Galapagos are islands of elevation, was held until about 1890 with scarcely

any question. It is strongly supported by the following facts: (1) All parts of the islands now visible are obviously of volcanic origin. (2) The islands are separated from the mainland by a very considerable depth of ocean (more than 1500 fathoms). (3) The western coast of South America shows no signs of subsidence, but rather of marked elevation in recent geologic time.

In accordance with this theory of emergence, the flora of the Galapagos Islands is assumed to have been brought to them by the ordinary agents of plant-distribution, namely, the wind, oceanic currents, and migratory birds. Moreover, it is not difficult to see the probable efficiency of these means of seed-transportation in the present case. The islands lie in the course of pretty constant trade winds, doubtless capable of bearing spores and small seeds to a great distance, as winds have been known to carry fine particles of sand and pumice for hundreds of miles. The great ocean current which sweeps along the west coast of Mexico, and the Humboldt Current, which runs northward along the coast of Chili and Peru, both turn westward just in the equatorial belt where the islands lie. That the current between Central America and the Galapagos has considerable seed-carrying power, seems more than probable from the interesting observations of Mr. Alexander Agassiz (1), 59, 69, who while dredging that part of the Pacific found the bottom "strewn thickly with vegetable matter, which came up in great masses in almost every haul of the trawl." He states also that: "The velocity of the currents in the Panama district is very great, sometimes as much as seventy-five miles a day, so that seeds, fruits, masses of vegetation harboring small reptiles, or even large ones, as well as other terrestrial animals, need not be afloat long before they might safely be landed on the shores of the Galapagos." It may here be noted that Hooker (4), 256, has shown that a large proportion of the plants of the Galapagos Islands are provided with special means of seed-dispersal, — a fact of interest in this connection.

But, however probable the pelagic origin of the islands seems from the data above presented, Dr. Baur has pointed out what has appeared to be a fatal defect in this theory. For, although it may be quite possible to explain the presence of plants and some animals upon islands of emergence, it is much more difficult if not impossible to explain upon the same theory the extraordinary biological relations between these islands themselves. An examination of the flora shows that many plants on the different islands are nearly related to each other, without being exactly the same. For instance, each of several islands has a peculiar species of *Scalesia*, a genus confined to the archipelago. There are also on

these islands several different forms of *Euphorbia viminea*, several very nearly related species of *Acalypha*, many habitally uniform species of *Borreria*, and of many other genera. In many instances these forms are confined to a single island, and in the majority of cases each form is more closely related to those of the other islands than to any continental ally. The same is true of the fauna, for the animals of particular groups, while exhibiting near affinity, show slight differences, which can in many cases be correlated with their occurrence upon different islands. Thus the flora and fauna of the islands are, to use Dr. Baur's expression, harmonic.

From this peculiar distribution, which seemed to him wholly inexplicable upon the emergence theory, Dr. Baur advanced the view that the Galapagos were islands of subsidence, once attached to the continent by some isthmian connection extending presumably to the Central American coast. In an enthusiastic presentation of this theory, Dr. Baur certainly advanced in support of it some as yet unanswered biological arguments. Thus, it explains perfectly the harmonic relations of the living forms upon the different islands; for if the islands were once united and then by subsidence separated, the remnants of their common flora and fauna, persisting upon the different islands, would have diverged not only from the continental types, but from each other. From the depth of ocean between the archipelago and the mainland, it would naturally be inferred that the islands were cut off from the continent before they were divided from each other. This, on the supposition of a gradual variation, would account not only for the divergence, for instance, of the genus *Scalesia* from its Mexican allies, but for the minor differences which are found between the different species of *Scalesia* on the several islands, where they occur; while, as we have seen, this harmonic distribution of very similar yet slightly differing forms on the different islands has appeared unaccountable, on the theory that these are islands of emergence casually seeded. For, to quote from a discussion of the forms of *Euphorbia viminea*:[1]

"The question at once presents itself, if this archipelago is composed of islands of elevation, built up from the sea-floor independently by volcanic action, how has such a distribution been effected. If the vegetation has been derived from the mainland by the chance transportation of seeds, it is quite impossible to believe that each island has received a slightly different form of the same species, and we are forced to the much more natural assumption that racial and varietal divergence has come about after the introduction of the species upon the islands. Now, continuing

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1 Rob. & Greenm. (1), 136.

the supposition that these are islands of elevation, the seeds of *Euphorbia viminea* must have reached them in one of two ways: either each of the nine islands, where we know the species now to occur, must have received its seed directly from the mainland, or, what is much more natural, seed must have reached one or more of the islands and from these spread to the rest. That the same species should have reached all these islands presupposes a considerable facility of transportation. But as soon as this is granted it is impossible to understand the highly individual development of the forms upon the different islands. For relative or complete isolation seems necessary to account for the racially divergent floras of the islands; and especially for the occurrence of only one form upon each island. It would thus appear necessary, in accounting for the present distribution, to assume that at one time in the remote past, the islands were either united, or at least that the channels which separate them were less formidable barriers to seed-transportation than at present, so that a general distribution of species could have been effected; and that subsequently, as the islands separated, or as the channels through some change of currents, or other cause, became less easily passed, an era of *much* greater isolation of the floras of the different islands came about. The divergence of character of the vegetation would then begin at once, and the otherwise unaccountable existence of a single and peculiar form upon each island would be readily intelligible. While not prepared to make any positive assertion regarding the probable origin of the islands, the authors fail to see in the hitherto generally accepted theory of elevation any satisfactory explanation for the harmonic yet divergent floras of the different members of the group."

Finally, for the subsidence theory, it must be admitted that the direct geological arguments for the elevation of the islands are not so forcible as they at first appear. Thus, as Baur has pointed out, the fact that all parts of the islands now visible are volcanic proves little; for if the Andes were sunk until only equivalent land areas remained, they too would appear wholly volcanic; and as to the recent elevation of the South American coast, that, as I am informed by Professor W. M. Davis, is no conclusive proof that areas five hundred miles to the seaward have suffered like elevation or, indeed, that they have not been simultaneously subjected to a sort of counter-balancing subsidence.

Such, in brief, have been the arguments advanced on both sides regarding the origin of the Galapagos Islands. During a re-examination of the whole vascular flora of the islands, I have sought further light upon this question, and now find the peculiar distribution of the plants

less difficult to account for on the emergence theory than it seemed when the Baur plants were studied some years ago.

Let us consider theoretically what would be likely to happen to a plant casually introduced in a pelagic archipelago, where no plant of its particular affinity had previously found its way. Let us suppose, for instance, that the ancestral form of *Euphorbia viminea* reached Chatham Island from the continent, and that conditions of seed-transportation were such that subsequent seedings from the mainland would not be likely to happen oftener on the average than once in thirty, fifty, or perhaps one hundred years, — no unreasonable assumption. Now, it is known from observation that a plant introduced into a new region can overrun considerable territory and increase to thousands of individuals, even in a shorter space of time. It is further likely that a plant established upon such an island would be at once exposed to modifying influences and tend toward the formation of a new race particularly suited to its altered environment. Whether this were effected by direct influence or by natural selection is not significant in this case. In the interval between the first and second seeding the change would probably be very slight and taxonomically imperceptible, but that some modification would have taken place seems likely. It is clear that the second and subsequent seedings of the same island by the same species from the continent would tend by the infusion of pure stock to reclaim the incipient insular variation to the typical continental form of the species. But to see how great or rather how slight the influence of these later seedings would be, it is only necessary to consider the numerical relation of both forms. The descendants of the first immigrant might well have increased to many thousands of (slightly altered) individuals before the second seed arrived from the mainland. Thus the reclaiming influence of this second immigrant would not be as one to one but as one against thousands, that is to say, virtually nil. Of course, it might be thought that as the first seed increased in a few years to thousands of individuals, the second might do so likewise, so that their influence would after all be not very unequal. This, however, could scarcely happen for two reasons. In the first place the original seed would have found in the island (before uninhabited by any near relative) a fresh terrain, giving it an opportunity to multiply rapidly. The second immigrant, however, would find its proper habitat on the island no longer free for settlement, but largely if not entirely occupied by countless individuals of a very nearly related stock. It could scarcely fail to cross repeatedly with the insular form and quickly merge into it, the more so because the descend-

ants of the second seed would at once be subjected to the same modifying influences that had affected those of the first.

It is thus clear that the insular form, having once started its divergence from the continental type, would be likely to differentiate itself more and more and not be much affected by the occasional arrival of scattered and isolated seeds from the continent. Furthermore, if seeds of the Chatham form were by any chance carried to other islands of the archipelago, further specialized races would be almost certain to arise bearing much the same relation to that of Chatham that it bore to the continental form, and quite as little affected by subsequent seedings. Thus unchecked, the races would have every opportunity to develop into more and more highly differentiated forms, varieties, and ultimately into well-marked species characteristic of particular islands.

This may all seem purely hypothetical, but it will be seen that the conclusions rest upon only two very natural premises, namely, that seed-transference between the mainland and the islands or between the islands themselves, does not occur in the case of particular plants oftener, on the average, than once in several years, and in the second place that plants have multiplied on the islands as rapidly as they have frequently been observed to multiply elsewhere. When these two not unreasonable postulates are admitted, it is clearly no harder to account for the existence of a "harmonic" flora on islands of emergence than of subsidence. Indeed, it is what is to be expected in an archipelago of either kind where seed-transference is relatively rare. That this condition obtains in the case of the Galapagos is clearly shown by the existing diversity in the floras of the different islands, — a condition which could not continue if seed-transference were very common between the islands. The fact that it is not more frequent is perhaps sufficiently explained by the arid and sterile shores, which would certainly offer to most seeds washed thither by oceanic currents an exceedingly poor chance of surviving.

The great existing difference between the Galapageian flora as a whole and that of tropical America is doubtless due not only to the differentiation of the insular forms, but also and perhaps in a considerable degree to changes which have been simultaneously going on in the continental flora itself. Thus the ancestral forms of many Galapageian plants, for instance of the above mentioned *Euphorbia viminea* (which might reasonably be sought in the deserts of Peru), have probably failed to persist at all upon the mainland. The fact that the florulae of the several islands are on the whole much more like each other than any one of them is like any part of the continental flora is perhaps

sufficiently explained by the relative nearness of the islands to each other, but it may well be due in part to the circumstance that these insular florulae have in common been protected from much of the change which has, through a sharper competition in the larger flora of the mainland, been forced upon the vegetation of the adjacent parts of the continent. In this matter again insular floras would fare alike, whether the islands they inhabited were the result of emergence or subsidence.

During the first years, or probably centuries, in the history of islands of emergence their floras, made up as they must be of heterogeneous elements which chance has brought to their shores, would be very unlike the far more homogeneous floras persisting on islands of subsidence; but after islands of each kind had attained considerable age, — that is an age sufficient to have given rise to a flora as specialized as that which now exists on the Galapagos, it is not likely that their floras would show any marked distinction, for, as we have seen, the development would not be unlike in the two cases. Although this negative result is in a way disappointing, it is certainly much better to admit a nullity of botanical evidence in regard to this interesting question than to attribute to the "harmonic" flora of these islands an historic meaning which it may not possess.

There is one point, however, from which botanical evidence can be derived which has a certain bearing upon this matter, namely, the relation which the proximity of the different islands bears to likeness in their florulae. The islands are so different in altitude, climate, and consequent fertility, that diversity in their vegetation is by no means surprising; but the difference certainly reaches a higher degree than we should expect. Thus, the common element between any two of these islands rarely exceeds 75 per cent and is often less than 50 per cent, sinking in some cases to nothing. Of course it is not unlikely that these differences may in some instances be more apparent than real owing to imperfect exploration, and it is probable that further collecting will show at least a small common element between each two of the islands. However, the differences in the recorded floras of the larger repeatedly visited islands cannot be due to our ignorance. Indeed, each new exploration brings quite as much material to demonstrate their diversity as their likeness. The most noteworthy feature of these differences is not, however, their extent, but rather the fact that for the most part they stand in no relation to the distance of the islands from each other or to the depth of the intervening channels. Thus the florulae of Albemarle and Chatham at opposite sides of the archipelago are more

alike than either is to that of the intervening Indefatigable; Jervis lying near James has a greater common floral element with the more distant Charles; the florulae of the Seymour Islands have a greater number of plants in common with Charles, Chatham, and Albemarle than with Indefatigable, of which the Seymour Islands are merely a detached spur. Although a high percentage of ferns has been recorded on James, not a single representative of this group has thus far been found on the adjacent Indefatigable. The common floral element between Duncan and the relatively remote Chatham is greater than with any of the three large islands, James, Indefatigable, and Albemarle, which to a considerable extent surround it. In fact, the only cases in which it appears that proximity between two islands has brought about any marked similarity on their floras are on the one hand Narborough and Albemarle, and on the other Gardner and Charles, and even in the former of these pairs, the likeness is by no means close, for not over 71 per cent of the plants of Narborough have been observed on Albemarle.

These anomalies in the different florulae must find their explanation in peculiarities of climate and soil, together with an element of chance — arising partly from imperfect exploration, and partly from the accidents of seed-dispersal. Although they are not fully explained by the theory that these are islands of emergence casually seeded, they are much less in accord with the Baur theory of subsidence; for, were the florulae remnants of a common flora persisting upon islands separated by gradual subsidence, it is evident that those islands would possess the most floral similarity which were nearest together and divided by the shallowest channels, since these would have been separated from each other more recently than the remoter islands, which are cut off by a greater depth of ocean. As we find no such relation prevailing in the Galapagos Islands, but have observed just the reverse, namely, that the more distant islands, separated by relatively deep channels, often show greater floral similarity than the nearer ones, it is necessary to conclude that the botanical evidence, so far as it has yet been made out, is opposed rather than favorable to the subsidence theory.

Addenda.

Plants collected on the Galapagos Islands by Dr. Franz Steindachner of the Hassler Expedition.

After the greater part of the present paper was in type, I received through the kindness of Dr. A. Zahlbruchner and Dr. A. Heimerl of

Vienna, a manuscript list of the specimens of plants collected on the Galapagos Islands in 1872 by Dr. Steindachner and now deposited in the Naturhistorisches Hofmuseum in Vienna. These plants were gathered rather as souvenirs of a peculiar flora than as scientific specimens, and many are fragmentary. The list at hand includes the pteridophytes (nos. 21 and 22) and spermatophytes (nos. 23 to 116). The first twenty numbers seem to have been applied to thallophytes and bryophytes, but these are not listed. The only plants mentioned which are not included in the above flora are *Tribulus terrestris*, L., *Crotalaria incana*, L., and *Rhynchosia Senna*, Gill. I have little doubt that the first of these is what Andersson has called *T. sericeus*, a plant which is too near to *T. terrestris* for very satisfactory distinction. Dr. Zahlbruchner writes that the labels furnish no data as to the particular islands upon which the plants were collected. The only new species among Dr. Steindachner's plants was *Tillandsia insularis*, Mez.

Plants collected by Messrs. Snodgrass and Heller on Cocos Islana of the Pacific.[1]

Leptogium azureum (Ach.) Mont.[2]
Macrolejeunea subsimplex (Mont.) Schiffn.[3]
Plagiochila Anderssonii, Angstr.[3]
Platylejeunea pogonoptera (Spruce) Evans (Lejeunea [Platy-Lej.] pogonoptera, Spruce).[3]
Pilotrichum asperifolium, Mitt.[2]
Rhizogonium spiniforme (L.) Br.[2]
Acrostichum caudatum, Hook. (no. 959).
Adiantum intermedium, Sw. (no. 967).
Alsophila armata, Presl (no. 964).
Asplenium rhizophyllum, Kunze (no. 954).
Dicksonia cicutaria, Sw. (no. 952).
Gymnogramme calomelanos, Kaulf. (no. 970).
Nephrolepis acuta, Presl (no. 953).
Polypodium aureum, L. (no. 969).

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[1] With the collaboration of Professor H. Pittier, the author is preparing a catalogue to bring together the now scattered references to the flora of Cocos Island, and unite with them the data derived from recent and very interesting collections. In this subsequent paper the species here listed will be treated in greater detail.

[2] Determined by W. G. Farlow.

[3] Determined by A. W. Evans.

Polypodium chnoodes, Spreng. (no. 948).
" lanceolatum, L. (no. 958).
" Phyllitidis, L. (no. 965).
Trichomanes Prieurii, Kunze (no. 955).
" pyxidiferum, L. (no. 956).
" radicans, Sw. (no. 973).
Selaginella stenophylla, A. Br. (no. 972).
Lycopodium mollicomum, Mart. (no. 971).

Chloris **paniculata**, Scribner, nov. sp., " perennans dense caespitosa 3–5 dm. alta foliis longis angustis, inflorescentia dense paniculata 8–10 cm. longa; vaginis carinatis compressis laxis; laminis foliorum linearibus 3–4 mm. latis longe attenuatis serrulatis praeter marginis scabrae glaber, foliis inferioribus numerosis in specimine inspecta culmo aequantibus vel etiam superantibus; paniculae simplicis ramis numerosis congestis adscendentibus circa 2 cm. longis superioribus brevioribus, axe principali pubescenti rachide secundario valde scabro spiculas unilaterales valde imbricatas biseriales gerente; spiculis 2.5–3 mm. longis, glumis sterilibus lanceolatis acutis translucentibus uninervatis carina scabra, prima circa 1.5 mm. secunda circa 2.5 mm. longa, gluma fertili oblongo-lanceolata truncata 2–2.3 mm. longa in margine carinaque scabra, nervo medio in setam scabridam 1–1.5 mm. longam producto; callo dense barbato, capillis longissimis circa 1 mm. aequantibus: flosculo sterili 1 mm. longo vel breviori setam suae longitudinis gerente." — Nuez Isl. (an islet near Cocos Isl.): abundant in bunches 3–5 dm. in diameter, covering considerable areas on cliffs near the coast, *Snodgrass & Heller*, no. 968 (hb. Gr., hb. U. S. Dept. Agric.). Endemic. "This grass is somewhat anomalous, having the infloresence of *Leptochloa*, suggesting that of *L. scabra*, while the spikelets are those of *Chloris*, to which it has seemed best to refer it."

Paspalum conjugatum, Berg. (no. 943).
" platycaule, Poir. (no. 942).
Calyptrocarya Palmetto, Nees (no. 947).
Cyperus sphacelatus, Rottb. (no. 946).
Hypolytrum sp. (no. 945).

Kyllinga **nudiceps**, C. B. Clarke, nov. sp., " culmis caespitosis, filiformibus; foliis nullis; spica 1, parva, globosa, pallida; bracteis spica brevioribus —

Rhizoma visum vix 5 mm. longum. Culmi 2–3 dm. longi. Vaginae pallide bruneae, glandulis rubris laete inspersae, apice in altero latere productae, non virides. Spica 5 mm. in diam., multispiculosa; bractea

ima interdum 4 mm. longa, apice lineari viridi, saepius inconspicua. Spicula 1-flora (omnino ut *K. odoratae*, Vahl), supra 2 glumas imas vacuas caduca. Nux obovoidea, lateraliter compressa, brunea; styli basis non dilatata, rami 2 lineares." — Cocos Isl.: *Snodgrass & Heller*, no. 944 (hb. Gr.), type; also on shady cliffs, Wafer Bay, *Pittier*, no. 16272 (hb. Gr.)

Catopsis aloides, Baker (no. 962).
Peperomia nigro-punctata, Miq. (no. 957).
Hibiscus tiliaceus, L. (no. 961).
Conostegia lasiopoda, Benth. (no. 963).
Ossea macrophylla, Cogn. (no. 951).
Jussieua linifolia, Vahl (no. 950).
Ardisia cuspidata, Benth. (no. 949).
Rolandra argentea, Rottb. (no. 960).
Wedelia paludosa, DC. (no. 966).

INDEX.

(Roman numbers indicate pages where the respective genera and families receive their principal treatment; italic numbers show the pages upon which the names are merely mentioned or occur as synonyms.)

Abingdon Island, 243.
Abutilon, 173, *231*.
Acacia, 147, *228*, *229*, *237*.
Acalypha, *79*, 161–165, *230*, *255*.
Acanthaceae, 203, *243*.
Acanthospermum, 208, *235*, *238*, *248*.
Acnistus, 198, *233*.
Acrolasia, *178*.
Acrostichum, 104, 105, *112*, *224*, *241*, *261*.
Adiantum, 105, 106, *224*, *261*.
Agaricina, *83*.
Agaricus, *83*.
Ageratum, 209, *235*.
Agrostis, *125*.
Aizoaceae, 143, *241*, *243*.
Albemarle Island, 244.
Alectoria, *86*.
Algae, 89.
Allochlamys, *137*.
Alsophila, *112*, *261*.
Alternanthera, 134, 135, *138*. *140*. *227*.
Amarantaceae, 134, *241*, *243*, *249*, *251*.
Amaranthus, 135, 136, *227*, *228*, *248*.
Amaryllidaceae, 131.
Amblogyna, *136*.
Amblogyne, *135*, *136*.
Amphiroa, 93.
Amphochaeta, *124*.
Ancistus, *198*.
Ancyrostemma, *178*.
Anoda, 173, *231*.
Anthephora, 116, *225*.
Apium, 184, *232*.
Aplopappus, 209, *235*.
Apocynaceae, 185, *243*.
Ardisia, *263*.
Aristida, 116, 117, *126*, *225*.
Aroids, *241*.
Arthonia, *83*, 84.
Asclepiadaceae, 185, *243*.
Asclepias, 185, *232*.
Aspidium, 106, *110*, *224*.
Asplenium, 106–108, *224*, *241*, *261*.
Astragalus, 148, *229*.

Atriplex, 134, *227*, *237*, *252*.
Aulescus, 90.
Avicennia, 194, *233*, *237*.
Azolla, 115, *225*, *237*.

Baccharis, 209, *235*.
Barrington Island, 245.
BASELLACEAE, 141.
Bastardia, 173, *231*.
Batatas, *188*.
BATIDACEAE, 141.
Batis, 141, *228*, *237*.
Biddulphia, 90.
Bidens, 210, *235*, *237*, *238*.
BIGNONIACEAE, 202, *242*.
Bindloe Island, 245.
Black Beach, *246*.
Blainvillea, 210, 211, *235*.
Blechnum, 108, *224*.
Boerhaavia, *79*, 141, 142, *143*, *228*, *237*.
Boletus, *83*.
BORAGINACEAE, 189, *241*, *243*, *248*, *249*.
Borrera, *86*.
Borreria, 204–206, *234*, *243*, *247*, *249*, *255*.
Bouchea, *196*.
Boussingaultia, 141, *228*, *237*.
Bouteloua, 117, *225*.
Brachycladia, *95*.
Brandesia, *137*.
Brassica, 146, *228*, *238*.
Brattle Island, 245.
Brickellia, 211, *235*.
BROMELIACEAE, 130, *243*.
Bryopsis, 89.
Bryopteris, 100.
Bucholtzia, *138*, *139*.
Buellia, 84, 85.
Bursera, *86*, *88*, 159, 160, *230*, *250*.
BURSERACEAE, 159, *243*.
Byssus, *85*.

Cacabus, *201*.
Cacalia, *215*.
CACTACEAE, 178, *241*, *243*.
Caenopteris, *107*.
Caesalpinia, 148, *229*, *241*.
Calamagrostis, *121*.
CALLITRICHACEAE, 170.
Callitriche, 170, *231*, *237*.
Callophyllis, 93.
Calymperes, 102.
Calyptrocarya, *262*.
Calystegia, 186, *232*, *237*.
CAMPANULACEAE, 208.
Campylodiscus, 90.
Campyloneurum, *113*.
Campylopus, 102, 103.
Canavalia, 148, *229*, *245*.
Capraria, 202, *234*.
Capsicum, 199, *233*.
Cardiospermum, 170, 171, *231*, *237*, *252*.
Carica, 178, *232*.
CARICACEAE, 178.
Carpomitra, 90.
Carum, *184*.
CARYOPHYLLACEAE, 145.
Cassia, 148, 149, *229*.
Castela, 158, 159, *230*, *237*, *245*, *247*, *249*.
Catopsis, *263*.
Caulerpa, 89.
CELASTRACEAE, 170, *243*.
Cenchrus, 118, *225*, *238*, *239*.
Cenomyce, *85*.
Centella, 184, *232*.
Cereus, 179, 180, *232*, *236*, *237*, *245*, *246*.
Chaetochloa, *125*.
Chaetomorpha, *90*.
Charles Island, 246.
Chatham Island, 246.
Cheilanthes, 108, *109*, *224*.
CHENOPODIACEAE, 134.
Chiococca 206, *234*.
Chiodecton, 85.
Chloris, 118, 119, *225*, 262.
CHLOROPHYCEAE, 89.
Chondrus, 94.
Chrysanthellum, 211, *235*.
Chrysodium, *104*.
Chusquea, 119, *225*.
Cissampelos, 146, *228*, *237*.
Cissus, 172, *231*.
Citrullus, 207, *234*.
Cladonia, 85.
Clerodendron, 194, 195, *233*.
Cocos Island, *241*, 261.
Coelestina, *209*.
Coffee tree, *134*.
Coldenia, 189, *233*.
COMBRETACEAE, 182.
Commelina, 130, *227*.
Commelinacea, 131, *227*.
COMMELINACEAE, 130.
COMPOSITAE, 208, *241*, *242*, *243*, *248*, *249*, *251*.

Conferva, *89*.
Conocarpus, 182, *232*.
Conostegia, *263*.
Constantinea, *98*.
Convolvulaceae, 186, *241*, *243*, *248*, *251*.
Convolvulus, *186*.
Conyza, *212*.
Corallina, 94, *95*.
Corchorus, 172, *231*.
Cordia, 189–191, *233*, *245*.
Coronopus, *146*.
Crotalaria, 149, *229*, *261*.
Croton, 165, 166, *230*, *245*, *246*, *247*, *249*, *251*.
Cruciferae, 146.
Cryptocarpus, 142, *228*.
Cucumis, *207*.
Cucurbita, 207, *235*.
Cucurbitaceae, 207, *243*.
Culpepper Island, 247.
Cuphea, 182, *232*.
Cuscuta, 186, *232*, *238*.
Cyanophyceae, 89.
Cyperaceae, 126, *237*, *243*.
Cyperus, 126–129, *226*, *227*, *237*, *251*, *262*.
Cystopteris, 109, *224*.

Dactyloctenium, *119*.
Dalea, 150, *229*.
Daltonia, 103.
Darea, *107*.
Dasya, 94.
Datura, 199, *233*.
Dendrographia, *87*.
Desmanthus, 150, *229*.
Desmocephalum, *212*.
Desmodium, 150, 151, *229*.
Dianthera, *203*.
Diatomeae, 90.
Dichronema, 129, *227*, *237*.
Dicksonia, *261*.
Dicliptera, 203, *234*.
Dicranum, *102*.
Dictyocalyx, *201*.
Dictyota, *91*.
Digitaria, *123*.
Dilsea, 95.
Diodia, 206, *234*.
Discaria, 171, *231*, *237*, *245*.
Distichlis, *125*.
Dodonaea, 171, *231*.
Dolichos, *148*.
Drymaria, 145, *228*.
Dubreulia, *133*.
Duncan Island, 247.
Duranta, 195, *233*.

Eclipta, 211, *235*.
Elaphoglossum, *104*, *105*.
Elaphrium, *159*.
Elaterium, 208, *235*, *237*.
Eleocharis, 129, *227*, *237*, *238*.
Eleusine, 119, 120, *226*, *241*.
Elvira, 212, *235*.
Encelia, 212, *235*.
Enteromorpha, 89.
Epidendrum, 131, *227*, *238*.
Epiphytes, *238*.
Eragrostis, 120, *226*.
Erigeron, 212, 213, *235*.
Eriochloa, 121, *226*.
Erythrina, 151, *229*.
Eupatorium, 213, *235*.
Euphorbia, *158*, 166–169, *230*, *231*, *241*, *243*, *249–251*, *255–258*.
Euphorbiaceae, 161, *241*, *243*, *245*, *248*, *251*.
Eutriana, *117*.
Euxolus, *135*.
Everina, *88*.
Evolvulus, *79*, 186, 187, *232*, *237*.

Fagara, *158*.
Favolus, 82, *83*.
Filices, 104, *243*.
Fimbristylis, 129, *227*, *237*.
Flaveria, 213, *235*.
Fleurya, 132, *227*.
Floriana Island, 246.
Fomes, 83.
Froelichia, 136, 137, *228*.
Frullania, 100.
Fucodium, 90.
Fucus, *89*, *90*, *92*, *95*, *96*, *99*.
Fungi, 82.

Galactea, 151, 152, *229*, *237*.
Galapagoa, *189*.
Galaxaura, 95.
Gardner Island, 247.
Gelidium, 95, 96, *98*.
Geoffraea, 152, *229*, *248*.
Geoffroya, *152*.

Gigartina, 96.
Gleichenia, 109, *224*.
Glossophora, 90, 91.
Goniophlebium, *112*.
GOODENIACEAE, 208.
Gossypium, 173, 174, *231*.
Gracilaria, 96.
GRAMINEAE, 116, *243*.
Grasses, *245*, *249*.
Grossman Islands, 246.
Guaiacum, *159*.
Gymnogongrus, 96.
Gymnogramma, *109*.
Gymnogramme, 109, *224*, *261*.
Gymnosperms, *241*.
Gymnothrix, *124*.

Halophytes, *237*.
HALORRHAGIDACEAE, 183.
Haplopappus, *209*.
Hawaiian Islands, *238*.
Helianthoideae, *242*.
Heliophytum, *192*.
Heliotropium, 192, *233*, *237*.
Helopus, *121*.
Helosciadium, *184*.
Hemicarpha, 130, *227*, *237*.
Hemionitis, *104*.
Hemizonia, 213, *235*.
HEPATICAE, 100.
Herpophyllon, 97.
Hibiscus, 174, *231*, *241*, *263*.
Hippomane, 169, *231*.
Hood Island, 248.
Hydrocotyle, 184, *232*.
Hymenophyllum, *241*.
Hypnea, *96*, 98, *103*.
Hypochnus, *85*.
Hypolepis, 109, *224*.
Hypolytrum, *262*.
Hypoxis, 131, *227*.
Hyptis, 197, *233*.

Illicebrum, *138*.
Indefatigable Island, 248.
Ipomoea, 187–189, *232*, *233*, *237*, *238*, *241*, *251*.
Iresine, 137, *228*.
Iridacea, *94*.

Jaegeria, 213, *235*.
James Island, 249.
Jervis Island, 249.
Jungermannia, *100*.
Jussieua, *263*.
Justicia, 203, *234*, *243*.

Kallstroemia, 156, *229*, *237*.
Kallymenia, *98*.
Kyllinga, 130, *227*, *237*, 262.
Kyllingia, *130*.

LABIATAE, 197, *241*, *243*.
Laguncularia, 183, *232*, *237*.
Lamiacea, *197*.
Lantana, 195, *233*.
Laportea, *132*.
Laurencia, 98.
Lecanora, *83*, 85.
Lecidea, *84*.
Lecocarpus, 213, *235*, *238*, *242*.
LEGUMINOSAE, 147, *241*, *243*, *245*, *248*, *251*.
Lejeunea, *261*.
Lemna, 130, *227*, *237*.
LEMNACEAE, 130.
Lepicystis, *112*, *113*.
Lepidium, *146*.
Leptochoa, 121, *226*, *245*, *262*.
Leptogium, *261*.
Lichen, *85*, *86*, *88*.
LICHENES, 83.
Liliaceae, *241*.
LINACEAE, 156.
Linum, 156, *229*.
Lipochaeta, 214, *235*, *238*.
Lippia, 196, *214*, *233*.
Lithobrachia, *114*.
Lithocardium, *190*, *191*.
Lithophyllum, 98.
Lithothamnium, 98.
Litobrochia, *114*.
LOASACEAE, 178.
Lobelia, 208, *235*.
Lonchitis, *109*.
Lopholejeunea, 100.
LORANTHACEAE, 133, *243*.
Lorentia, *214*, *215*.
Lycium, 199, *233*.
Lycopersicon, *199*.
Lycopersicum, 199, 200, *233*, *234*.
LYCOPODIACEAE, 115.
Lycopodium, 115, *225*, *262*.
LYTHRACEAE, 182, *241*.

Macraea, *214*, *242*.
Macrolejeunea, *261*.
Macromitrium, 103.
Malachra, 174, *231*.
Malvaceae, 173, *241*, *243*, *248*.
Manihot, 169, *231*.
Marchesinia, 101.
Marginaria, *111*, *112*.
Mariscus, *126–128*.
Mastogloia, 90.
Maytenus, 170, *231*, *245*.
Melanocarpum, *137*.
Melastomaceae, 183, *241*, *243*.
Melobesia, 98.
Melosira, 90.
Menispermaceae, 146.
Mentzelia, 178, *232*.
Merremia, *188*.
Miconia, 183, *232*.
Microcoecia, *212*.
Mimosa, 152, *229*, *237*.
Mollugo, 143, 144, *228*.
Momordica, 208, *235*, *237*.
Musci, 102.
Myriophyllum, 183, *232*.
Myrtaceae, 182, *241*, *243*.

Najadaceae, 116.
Najas, *89*, 116, *225*, *237*.
Narborough Island, 250.
Navicula, 90.
Neckera, *103*.
Nephrodium, 110, *224*, *225*.
Nephrolepis, 110, 111, *225*, *241*, *261*.
Neptunia, *79*, 152, *229*.
Neurocallis, *104*.
Nicotiana, 200, *234*.
Nothochlaena, 111, *225*.
Notothylas, 101.
Nyctaginacea, 143, *228*.
Nyctaginaceae, 141, *241*, *243*, *250*.

Ochtodes, 99.
Oedogonium, 89.
Olfersia, *104*, *105*.
Omphalanthus, 101.
Onagraceae *241*.
Oplismenus, 121, *122*, *226*.
Opuntia, *125*, 180, 181, *232*, *236*, *237*, *245*, *247*, *248*, *251*.
Orchidaceae, 131, *243*.
Orthotrichum, *103*, *104*.
Ossea, *263*.
Oxalidaceae, 156, *243*.
Oxalis, 156, *229*.

Padina, 91, 92.
Palms, *241*.
Palo Santo, *88*, *134*, *160*.
Panicum, 122, 123, *124*, *125*, *226*, *241*.
Papillaria, 103.
Parietaria, 132, *133*, *227*.
Paritium, *174*.
Parkinsonia, 152, *229*, *237*.
Parmelia, 85, *86*.
Paspalum, 123, 124, *226*, *241*, *262*.
Passiflora, 177, *232*.
Passifloraceae, 177, *242*.
Pectidium, *215*.
Pectis, 214, 215, *235*.
Pellaea, 111, *225*.
Peltolejeunea, 101.
Pennisetum, 124, *226*.
Peperomia, 131, 132, *227*, *238*, *243*, *263*.
Pertusaria, *83*, 85.
Petroselinum, 184, *232*.
Peyssonnelia, *98*, 99.
Phaca, *148*.
Phaeophyceae, 90.
Phaseolus, *151*, 153, *229*.
Phoradendron, 133, 134, *227*, *238*.
Phragmicoma, *101*.
Phyllanthus, 169, *231*.
Physalis, 200, 201, *234*.
Physcia, 85.
Phytolacca, 141, *228*.
Phytolaccaceae, 141.
Pilea, 133, *227*.
Pilotrichella, 103.
Pilotrichum, *261*.
Piperaceae, 131, *243*, *245*.
Piptadenia, *152*.
Piscidia, 153, *229*.
Pisonia, 143, *228*.
Plagiochasma, 101.
Plagiochila, 101, *241*, *261*.
Plagiogramma, 90.
Plantaginaceae, 204.
Plantago, *185*, 204, *234*.
Platylejeunea, *261*.
Pleopeltis, *111–113*.
Pleuridium, *112*.
Pleuropetalum, 137, *228*, *244*.
Plocamium, 99.

PLUMBAGINACEAE, 185.
Plumbago, 185, *204*, *232*.
Poa, *120*.
Poinciana, *148*.
Polygala, 160, 161, *230*.
POLYGALACEAE, 160, *243*.
POLYGONACEAE, 134, *243*.
Polygonum, 134, *227*.
Polypodium, *106*, *110*, 111–114, *225*, *241*, *251*, *261*, *262*.
Polyporus, *83*.
Polystichum, *106*.
Porophyllum, 215, *235*, *237*.
Portulaca, *144*, 145, *228*.
PORTULACACEAE, 145.
Potamogeton, 115, 116, *225*.
POTAMOGETONACEAE, 115.
Prosopis, 153, *229*.
Pseudocyphellaria, 86.
Psidium, 182, *232*.
Psychotria, 185, 207, *234*.
Pteris, *111*, 114, 115, *225*.
Pycreus, *127*.
Pyrenula, *84*, 86.

Radula, 101.
Ramalina, 86, *88*.
Raphanus, 146, *228*, *238*.
Rauwolfia, *185*.
Relbunium, 207, *234*.
RHAMNACEAE, 171.
Rhizoclonium, 89, *90*.
Rhizogonum, *261*.
Rhizophora, 182, *194*, *232*, *237*, *247*.
RHIZOPHORACEAE, 182.
RHODOPHYCEAE, 93.
Rhodymenia, 99.
Rhynchosia, *79*, 154, *229*, *237*, *261*.
Riccia, 101.
Ricinus, 170, *231*, *241*.
Rinodina, *83*, 87.
Roccella, 87, 88.
Roccellaria, *87*, *88*.
Rolandra, *263*.
ROSACEAE, 146, *242*.
Rubia, *207*.
RUBIACEAE, 204, *241*, *243*, *248*, *251*.
Ruppia, 116, *225*, *237*.
Rushes, *241*.
RUTACEAE, 158.
Rutilaria, 90.

Salvia, 197, 198, *233*, *238*.
Salvinia, 115, *225*, *237*.
SALVINIACEAE, 115.
Sanguisorbea, 146, *228*.
SAPINDACEAE, 170, *241*, *243*.
Sapindus, 171, *231*.
Sarcanthus, *192*.
Sargassum, 92, 93.
Sarratia, *136*.
Scaevola, 208, *235*, *237*.
Scalesia, 216–220, *235*, *236*, *242–245*, *247*, *249*, *251*, *254*, *255*.
Schizophyllum, 83.
Schlotheimia, 104.
Scirpus, *129*, *130*.
Scleria, 130, *227*, *237*.
Scleropus, *135*, *136*.
Sclerothrix, 178, *232*.
Scoparia, 202, *234*.
Scrophulariacea, 202, *234*.
SCROPHULARIACEAE, 202.
Scytonema, 89.
Selaginella, *262*.
Senebiera, 146, *228*.
Sesuvium, 144, *228*, *237*.
Setaria, 124, 125, *226*.
Seymour Islands, 250.
Sicyos, 208, *235*, *237*.
Sida, *173*, 174–176, *231*.
SIMARUBACEAE, 158, *243*.
Sinapis, *146*.
Solanacea, *201*.
SOLANACEAE, 198, *241*, *243*.
Solanum, *200*, 201, *234*.
Sonchus, 220, *236*.
Spatoglossum, 93.
Spermacoce, *204–206*, *207*, *234*.
Sphaeria, *84*.
Sphaerococcus, *94*, *96*, *99*.
Spilanthes, 220, *236*.
Spondias, *159*.
Sporobolus, 125, *226*.
Stachytarpheta, 196, *233*.
Stenotaphrum, 126, *226*.
STERCULIACEAE, 176, *243*.
Sticta, *86*, 88.
Stipa, 126, *226*.
Stylosanthes, *79*, *154*, *229*.
Surirella, 90.

Taenitis, 115, *225*.
Tagetes, 220, *236*.

Tamonea, *183*.
Tecoma, 202, *234*.
Telanthera, 137–140, *228*, *247*, *251*.
Teloschistes, 88.
Tephrosia, 155, *229*, *237*.
Tetramerium, 204, *234*.
Teucrium, 198, *233*.
Theloschistes. See Teloschistes.
Thinogeton, 201, *234*, *237*, *247*.
Tiliaceae, 172.
Tillandsia, 130, *227*, *238*, *261*.
Tournefortia, 193, 194, *233*.
Tower Island, 250.
Trianthema, 144, *228*.
Tribulus, *79*, *156*, 157, *229*, *230*, *237*, *238*, *247*, *261*.
Triceratium, 90.
Trichomanes, *241*, *262*.
Trichoneuron, *121*.
Trigonopterum, *214*.
Triumfetta, 172, *231*.
Turnera, 177, *232*.
Turneraceae, 177.

Ulva, 90.
Umbelliferae, 184, *243*.
Urtica, *132*.
Urticaceae, 132, *243*.
Usnea, 88.

Vallesia, 185, *232*.
Varronia, *189–191*.
Verbena, 196, 197, *233*, *237*, *247*.
Verbenaceae, 194, *241*, *243*.
Verbesina, *210*, *215*.
Verrucaria, *86*.
Vigna, 155, *229*, *238*.
Vincetoxicum, *185*, 186, *232*.
Viscum, *133*.
Vitaceae, 172.
Vitis, 172, *231*, *238*.
Vittaria, *115*.

Waltheria, *79*, 176, *232*.
Wedelia, *211*, *263*.
Wenman Island, 251.

Xanthoxylon, *158*.

Zanthoxylum, 158, *230*, *237*.
Zonaria, *91*, 93, *98*, *99*.
Zygomorphy, *238*.
Zygophyllaceae, 156, *243*.

EXPLANATION OF PLATES.

PLATE 1. Fig. 1, *Phoradendron uncinatum*, Robinson, n. sp. Fig. 2, *Bursera malacophylla*, Robinson, n. sp. Fig. 3, fruit of ray-flower of *Acanthospermum microcarpum*, Robinson, n. sp. Fig. 4, fruit of ray-flower in *Acanthospermum hispidum*, DC. Figs. 5, 6, 7, *Telanthera Helleri*, Robinson, n. sp. Fig. 8, leaf of *Telanthera Helleri*, var. *obtusior*, Robinson, n. var. Fig. 9, *Scalesia Helleri*, Robinson, n. sp. Fig. 10, the same, a pale of the disk.

PLATE 2. Fig. 1, *Pilea Baurii*, Robinson, n. sp. Fig. 2, *Telanthera Snodgrassii*, Robinson, n. sp. Fig. 3, *Acnistus insularis*, Robinson, n. sp. Fig. 4, *Bidens refracta*, Brandegee. Fig. 5, *Euphorbia nesiotica*, Robinson, n. sp.

PLATE 3. Fig. 1, *Scalesia Hopkinsii*, Robinson, n. sp. Figs. 2, 3, *Scalesia microcephala*, Robinson, n. sp. Figs. 4, 5, 6, 7, *Scalesia narbonensis*, Robinson, n. sp. Fig. 8, *Scalesia Snodgrassii*, Robinson, n. sp.

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By J. M. Greenman.

Presented May 13, 1903, by B. L. Robinson.

The descriptions and notes in the present paper are the result of the study of several series of Mexican and Central American plants, chiefly from the recent collections of Cyrus Guernsey Pringle, Dr. Edward Palmer, Dr. Joseph Nelson Rose, Edward William Nelson, Señors Cassiano Conzatti and Valentin González, C. H. T. Townsend and C. M. Barber, E. W. D. Holway, Captain John Donnell Smith, Henri Pittier, and Adolfo Tonduz.

The herbarium in which the types and other mentioned specimens occur is indicated immediately after the citation of the numbered specimen; and the abbreviations for the different herbaria are as follows: hb. Gr. (Gray Herbarium), hb. U. S. Nat. Mus. (Herbarium of the United States National Museum), hb. J. D. S. (Herbarium of John Donnell Smith), hb. Inst. Phys.-Geog. Cost. Ri. (Herbarium of the National Physico-Geographical Institute of Costa Rica). For the most part the species represent the *Metachlamydeæ*, especially the *Compositæ*; although a few *Archichlamydeæ*, as well as *Monocotyledoneæ*, are herein described.

Rhynchospora Pringlei. Pale green: culms triangular, 1 m. or more high: stem-leaves remote; sheath slightly inflated, 5 to 7 cm. long; blade 2 to 4.5 dm. long, 8 to 10 mm. broad, hispidulous on the margins and along the midrib beneath: inflorescence cymose-paniculate; the terminal cymule subsessile or short pedunculate, the lateral on long slender peduncles 4 to 10 cm. in length; bracts lance-attenuate; scales of the spikelet broadly ovate, 1-nerved, terminated by a short awn, brown or somewhat

chestnut-colored: achene flattened, oblong-obovate, 3 to 4 mm. long, bearing on either surface in the upper half near the margin a longitudinal ridge, minutely pitted, dark brown in color; tubercle or beak conical, about as long as the achene: setæ unequal, 6 in number and mostly shorter than the achene. — MEXICO. State of Michoacan: in swamps near Zamora, altitude 1500 m., 24 May, 1901, and 25 July, 1902, *C. G. Pringle*, nos. 9668, 8642 (hb. Gr.).

The affinity of *Rhynchospora Pringlei* is with *R. aurea*, Vahl., and *R. aristata*, Boeck., but it differs from both these species in the contracted inflorescence, and in the achenial characters.

Tradescantia dracænoides. *T. longifolia*, Greenm., Proc. Am. Acad. xxxiii. 471 (1898), not Small, Bull. Torr. Bot. Cl. xxiv. 233 (1897). *Dichorisandra longifolia*, Mart. & Gal. Bull. Acad. Brux. ix. 378 (reprint p. 7). *T. holosericea*, var. *dracænoides*, Clarke in DC. Monogr. Phanerog. 302; Hemsley, Biol. Cent.-Am. Bot. iii. 393.

Tradescantia saxicola. Stems decumbent or ascending, simple or branched, 1 to 2 dm. high, commonly rooting at the nodes, glabrous except along a line continuous with the short ciliated sheath opposite the leaf-blade, purplish: leaves narrowly lanceolate, 1.5 to 4 cm. long, 4 to 8 mm. broad, acute, slightly hirtellous-margined, sparingly pubescent above, glabrous beneath: inflorescence terminating the stem and branches in sessile subumbellate floral-clusters; pedicels reflexed and, as well as the calyx, hirsute-pubescent: sepals oblong-ovate, 4 to 4.5 mm. long, obtuse: petals white, somewhat exceeding the calyx: stamens unequal; the outer cycle shorter, and with glabrous filaments; the inner fully equalling the petals, with bearded filaments, and with anther-cells separated by rather broad connectives: capsule small, smooth and glabrous, 2 to 3 mm. in length. — MEXICO. State of Guerrero: on ledges, Iguala Cañon, near Iguala, 14 September, 1900, *C. G. Pringle*, no. 9270 (hb. Gr.).

This species belongs to the section *Descantaria*, and in general habit resembles *T. angustifolia*, Robinson, *T. disgrega*, Kunth, and *T. multiflora*, Swartz.

Tradescantia Urbinana. Roots tuberiform, fleshy: stems branching from the base; branches erect, 2 to 5 dm. high, glabrous: leaves lanceolate or lance-attenuate, 5 to 10 cm. long, 0.5 to 1.5 cm. broad, acute, smooth-margined, glabrous on both surfaces; sheath slightly inflated, 0.5 to 1 cm. long: inflorescence terminating the branches in compound pedunculate umbels; bracts small, 3 mm. or less in length; peduncles and pedicels glabrous and, as well as the calyx, purplish:

flowers small, 1 cm. or less in diameter: sepals oblong, somewhat navicular, 4 to 6 mm. long, glabrous: petals ovate or subrotund, 5 to 6 mm. long and broad, deep purple: stamens 6, equal; filaments bearded; anthers uniform: capsule oblong, obtusely triangular, 5 mm. long, hirtellous-puberulent above. — MEXICO. State of Morelos: Sierra de Tepoxtlan, near Cuernavaca, altitude 2300 m., 11 September, 1900, *C. G. Pringle*, no. 9250 (hb. Gr.).

This species belongs to the section *Eutradescantia*, and is seemingly most nearly related to *T. Karwinskyana*, Roem. & Schult., and *T. linearis*, Torr. The writer takes pleasure in dedicating the species to Señor Dr. Manuel Urbina, Director of the National Museum, City of Mexico.

Zygadenus mohinorensis. Bulbs scaly-fibrous coated, about 2 cm. in diameter: scape 10 dm. high, commonly bearing 2 remote leaves: basal leaves, 5 to 6 dm. long, 10 to 14 mm. broad, attenuate to an obtuse tip, dark green and glabrous on both surfaces: inflorescence 3 to 4 dm. in length, branched below; branches erect, subappressed against the main axis; bracts of the inflorescence conspicuous, green or purplish, exceeding the 0.5 to 2 cm. long pedicels: flowers white or greenish-white, about 2 cm. in diameter; perianth-divisions oblong, 10 mm. long, 5 to 7 mm. broad, bearing at their base an obcordate or somewhat Y-shaped erose-margined gland: stamens included, equalling the style-branches, about one-half as long as the perianth-segments: mature fruit not seen. — MEXICO. State of Chihuahua: Mt. Mohinora, 1 September, 1898, *E. W. Nelson*, no. 4875 (hb. Gr., and hb. U. S. Nat. Mus.).

This species is most nearly related to *Z. elegans*, Pursh, but differs in the somewhat larger flowers, the more conspicuous and longer bracts of the inflorescence, and in the nature of the glands at the base of the perianth-segments.

VERATRUM CALIFORNICUM, Durand, Journ. Acad. Nat. Sc. Phil. Ser. II. iii. 103; Watson, Bot. Calif. ii. 182. The geographical range of this species is extended considerably southward by the collection of excellent specimens in the Sierra Madres near Colonia Garcia, State of Chihuahua, MEXICO, altitude 2450 m., 7 August, 1899, *Townsend & Barber*, no. 235 (hb. Gr.).

Anthericum drepanoides. Roots fleshy-fibrous, sometimes tuberous, fascicled, crowned by a collar of brownish fibres 2 to 3 cm. in length, the remains of the bases of the older leaves: assimilating leaves rosulate, about 9, lance-attenuate, 0.5 to 1.5 dm. long, 8 to 18 mm. broad, acute, conspicuously ciliate on the subcartilaginous margins, more or less con-

duplicate, at least in the dried state, glabrous on both surfaces, rather prominently and numerously nerved: scape 5 to 6 dm. high, few-branched above, terete, glabrous, bearing about 4 bracts: pedicels 1 cm. or less in length, jointed below the middle: flowers yellow: perianth about 12 mm. long; divisions narrowly oblong, 3-nerved; mature fruit not seen. — MEXICO. State of Oaxaca: Sierra de San Felipe, altitude 1830 m., 6 August, 1894, *C. G. Pringle*, no. 5757 (hb. Gr.).

Mr. Pringle's plant above cited was in the Gray Herbarium referred by the writer to *Anthericum Humboldtii*, Hemsley (*Phalangium ciliatum*, HBK., Nov. Gen. & Sp. i. 276, & vii. t. 676), but that species is a native of South America, first collected near Caracas, Venezuela, and has straight leaves 10 to 13 cm. long, 6 to 7 mm. broad, and is said to have white flowers.

Anthericum durangense. Roots tuberous, fascicled: leaves basal, lanceolate, 1.5 to 2.5 dm. long, 1.5 to 2 cm. broad, acuminate, acute, ciliate, dark green and glabrous on both surfaces: scape 4 to 5 dm. high, simple or branched, glabrous, or slightly hirtellous, usually unibracteate: floral bracts ovate, mostly acuminate, hyaline, nerved, greenish-white: pedicels jointed: perianth yellow, or yellowish-white in the dried state; divisions at the period of anthesis about 1.5 cm. long, 3-nerved. — MEXICO. State of Durango: near El Salta, altitude 2440 to 2650 m., 12 July, 1898, *E. W. Nelson*, no. 4544 (hb. U. S. Nat. Mus., and hb. Gr.).

Var. **trachycaulum.** Leaves in outline and size like the type, yellowish-green, ciliolate-scabrellous on the margins: scape hirtellous even to the flowers: perianth somewhat smaller than in the species proper, about 1 cm. in length: capsule 1 cm. long, glabrous. — MEXICO. State of Durango: Ramos to Inde, 11–14 August, 1898, *E. W. Nelson*, no. 4706 (hb. U. S. Nat. Mus., and hb. Gr.).

Anthericum Nelsonii. Roots tuberous, fascicled: leaves basal, narrowly lanceolate, 4 to 9 cm. long, 3 to 7 mm. broad, glabrous on both surfaces, minutely scabrellous on the subcartilaginous margins: scape 1 to 2 dm. high, glabrous, naked or bearing a single greenish-white nerved bract near or somewhat above the middle, terminated by 1 to 3 flowers: floral bracts scarious, greenish-white, nerved: pedicels 0.5 to 1 cm. in length, jointed in the middle: perianth yellow or in the dried state yellowish-white; divisions 8 to 10 mm. long, 3-nerved, obtusish or somewhat rounded at the apex: stamens nearly or quite as long as the perianth; anthers free: capsule about 1 cm. long. — MEXICO. State of Chihuahua: base of Mt. Mohinora, 12.8 km. from Guadalupe y Calvo,

altitude 2130 to 2285 m., 23–31 August, 1898, *E. W. Nelson*, no. 4844 (hb. U. S. Nat. Mus., and hb. Gr.).

Anthericum Nelsonii is apparently most nearly related to *A. nanum*, Baker, from which it differs in the glabrous character of the scape and by the twice longer capsule.

Echeandia flexuosa. Roots fascicled, tuberous, crowned by a collar 6 cm. in length, the persistent fibres of the bases of the older leaves: scape 7 to 9 dm. high, flexuous, glabrous, leafy at the base, bearing one or two reduced leaves on the main axis, few-branched above into arcuate-ascending more or less flexuous and somewhat compressed or subangulate branches: leaves linear-attenuate, 1.5 to 8 dm. long, 2 to 5 mm. broad, ciliolate to slightly roughened along the margins, thickish and firm in texture, closely parallel-nerved, without transverse anastomosing veinlets, glabrous above, scabrellous on the nerves of the outer or under surface: flowers 3 to 5 in the axils of short chartaceous bracts; pedicels jointed near or below the middle, 16 mm. or less long in fruiting specimens; perianth white or greenish-white, 10 to 12 mm. long; segments 3-nerved, the inner slightly broader than the outer: stamens about equalling the perianth; anthers coherent around the style; filaments plicated: capsule oblong, obtusely triangular, 7 to 10 mm. in length, valves somewhat rugose or transversely ridged: seeds black, about 1.5 mm. long and broad in the dried state. — MEXICO. State of Jalisco: Rio Blanco, July, 1886, *Dr. Edward Palmer*, no. 185 (hb. Gr.). State of Oaxaca: Mountains of Jayacatlan, altitude 1540 m., 10 September, 1894, *L. C. Smith*, no. 188 (hb. Gr.).

Very similar to this species is a specimen collected by Mr. C. G. Pringle on calcareous hills, Las Sedas, State of Oaxaca, altitude 1830 m., no. 5755 (hb. Gr.), but the anthers in Mr. Pringle's specimens are quite distinct, hence according to the present interpretation of the genera *Echeandia* and *Anthericum* it must be referred to the latter genus.

Echeandia macrocarpa. Scape 6 to 7 dm. high, leafy at the base, 2–3-bracteate above, glabrous: leaves lorate, 2 to 3 dm. long, 1.2 to 2 cm. broad, acute, entire or inconspicuously roughened along the margins, dark green and glabrous on both surfaces: inflorescence a glabrous panicle, about 3 dm. in length: pedicels jointed about one-third their length from the base, 2 cm. or less long: flowers 3 to 5 in the axils of chartaceous bracts: perianth white (?), 8 to 12 mm. long; segments 3-nerved; the outer 2 mm., the inner 3 mm. broad: stamens about equalling the perianth; anthers united or coherent into a tube around the style:

capsule 16 to 18 mm. long, prominently nerved. — MEXICO. State of San Luis Potosi: near Tancanhuitz, 2 May, 1898, *E. W. Nelson*, no. 4393 (hb. U. S. Nat. Mus., and hb. Gr.).

Hymenocallis graminifolia. Roots fleshy-fibrous: bulbs ovate-rotund, about 3 cm. high and nearly or quite as broad, covered with dark-brown scales: leaves lorate, 1.5 to 2 dm. long, 5 to 7 mm. broad, obtuse, entire, thin or submembranous: peduncle 1 to 1.5 dm. long, strongly 2-edged, especially above: flowers few (1 to 4), sessile: spathe-valves lance-attenuate, scarious: perianth-tube about 4 cm. long, greenish; segments lorate, narrowly lanceolate, slightly exceeding the tube: staminal-cup broadly funnel-shaped, about 3 cm. high; free portion of filament nearly or quite 2 cm. long: anthers versatile, 14 mm. long: style slender, greenish; stigma overtopping the anthers: cells of the ovary each containing 2 ovules. — MEXICO. State of Morelos: valley near Yantepec, altitude 1230 m., 6 July, 1901, *C. G. Pringle*, no. 8532 (hb. Gr.).

In habit this species approaches *H. humilis*, Watson, and *H. galvestonensis*, Baker, but differs materially in the size of the staminal-tube.

Hymenocallis Pringlei. Bulbs ovate-rotund, about 4 cm. long, equally broad, covered with dark-brown scales, which are continuous over the cylindrical 4 cm. long, and 1.8 cm. thick neck: leaves lanceolate, 1.2 dm. long, 1 to 2.5 cm. broad, narrowed at both ends, obtusish, entire, glabrous on both surfaces: peduncle 2 to 2.5 dm. long: spathe-valves lanceolate, attenuate, 4 to 5 cm. long, 12 mm. broad at the base, thin and scarious: flowers 4 to 6: perianth-tube 3.5 cm. long; segments somewhat exceeding the tube, narrow, 3 to 4 mm. broad: staminal-cup rather narrowly funnelform, 1.8 to 2 cm. high; free portion of filament about equalling the tube: style slender, greenish; stigma slightly overtopping the anthers: ovary sessile, bearing two ovules in each cell. — MEXICO. State of Hidalgo: hillsides near Tula, altitude 1100 m., 20 July, 1896, *C. G. Pringle*, no. 6371 (hb. Gr.).

Sisyrinchium bracteatum. Roots tuberous, fascicled: scapes 1 to 2 dm. high, simple below, branched above, erect or very slightly flexuous, hirsutish-pubescent to nearly glabrous: leaves linear-attenuate, 0.5 to 1.5 dm. in length: inflorescence branched, bearing several short-pedunculate spathes; peduncles mostly less than 1 cm. (rarely 1.5 cm.) long; bracts of the inflorescence foliaceous, 6 cm. or less in length, ciliate: spathe of two slightly unequal bracts, 13 to 16 mm. in length, rather strongly nerved, glabrous, the inner bract usually somewhat exceeding the outer: flowers of the spathe 2 to 4: perianth yellow; ovary

at first glandular pubescent: capsule oblong, triangular, 5 to 8 mm. long, hispidulous: seeds small, round, about 1 mm. in diameter; surface slightly honeycombed. — MEXICO. State of Oaxaca: in dry thin soil, Cuesta de San Juan del Estado, altitude 1850 m., 20 August, 1894, *C. G. Pringle*, no. 4831 (hb. Gr.), distributed as "*Sisyrinchium Hartwegii*, Baker form"; Valley of Etla, altitude 1660 m., 2 July, 1895, *L. C. Smith*, no. 556 (hb. Gr.). Federal District: lava fields near Tlalpam, altitude 2250 m., 16 August, 1902, *C. G. Pringle*, no. 8656 (hb. Gr.). The species here described is distinguished from *Sisyrinchium Hartwegii*, Benth., which is apparently the same as *S. tenuifolium*, Humb. & Bonpl., by the less branched and less flexuous scapes, the short-pedunculate spathes, and finally by the hirsutish character of the upper part of the scape and inflorescence.

Sisyrinchium Palmeri. Roots tuberous, fascicled, 2 to 3 cm. long, 5 to 7 mm. thick in the dried state: leaves linear-attenuate, 0.5 to 2.5 dm. long, somewhat sheath-like below and more or less purplish just above the base, smooth and glabrous: scape 1.2 to 2 dm. high, flattened, usually narrowly winged, branched above, bearing 2 to 4 pedunculate inflorescences: peduncles 1.5 to 4 cm. in length, mostly exceeding the nodal bract: spathes of two slightly unequal bracts, 1.5 to 2 cm. long, 3–7-flowered: pedicels 2.5 cm. or less in length: perianth yellow, 1.5 to 2 cm. in diameter: ovary glabrous: capsule oblong, 6 mm. long, 4 mm. thick, rather sharply 3-angled, smooth and glabrous: seeds about 1 mm. long and broad. — MEXICO. State of Jalisco: Rio Blanco, June, 1886, *Dr. Edward Palmer*, no. 18 (hb. Gr.); gravelly plains near Guadalajara, 15 July, 1902, *C. G. Pringle*, no. 8644 (hb. Gr.).

SISYRINCHIUM QUADRANGULATUM, Klatt, Linnæa, xxxii. 284. Specimens secured by Mr. C. G. Pringle on Mt. Orizaba, Mexico, at an elevation of 4000 m., 1901, no. 8566 (hb. Gr.), accord well with the original characterization of the above species, which was based upon plants collected by Liebmann on Mt. Orizaba in 1841. It may be said, however, that the color of the perianth in Mr. Pringle's specimens is distinctly blue, not yellow as was stated by Klatt to be the color of the flowers in the Liebmann plant. There is in the Gray Herbarium a specimen from the Liebmann collection, which was obtained on Mt. Orizaba at an elevation of 3000 m., and the label accompanying this plant bears the name "*Sisyrinchium scabrum*, Schlecht., var. *exaltatum*." Although this specimen was determined by Klatt, it does not seem to have been cited byhim in Linnæa xxxii. under the name which it bears. It seems altogether probable that the Liebmann plant in the Gray

Herbarium, here alluded to, represents a part of the type of *S. quadrangulatum*, Klatt, as it answers perfectly to the description. With it, moreover, Mr. Pringle's specimens are an excellent match. The species seems well characterized by the linear grass-like leaves, and the pyriform glabrous fruit, fully twice longer than in *S. angustifolium*, Mill., and its related forms.

SISYRINCHIUM TENUIFOLIUM, Humb. & Bonpl., var. **Seatoni.** Stems about 1 dm. high, much-branched, glabrous: leaves equalling or exceeding the inflorescence, slender, subfiliform: capsule pubescent. — MEXICO. State of Vera Cruz: Mt. Orizaba, altitude 2770 m., 9 August, 1891, *Henry E. Seaton*, no. 483 (hb. Gr.). State of Puebla: hillsides above Chalchicomula, altitude 2615 m., 27 July, 1901, *C. G. Pringle*, no. 9533 (hb. Gr.).

The variety *Seatoni* differs from the species chiefly in the lower stature, and in the filiform character of the leaves.

Habenaria oreophila. Glabrous throughout: stem erect, leafy, 7 to 8 dm. high: leaves oblong-lanceolate, 1 to 1.5 dm. long, 3 to 3.5 cm. broad, apiculate-acute, entire, membranous; the lowermost leaves reduced to mere sheaths, the uppermost gradually smaller: inflorescence a terminal elongated loose 2 to 3 dm. long raceme; bracts subfoliaceous, lanceolate-acuminate, about equalling the ovary: upper sepal ovate, cucullate, 8 mm. long, 3-nerved; lateral sepals oblong-lanceolate, slightly oblique, obtuse, 3-nerved: lateral petals deeply 2-parted; the upper division lanceolate, upwardly arched, shorter than and coherent with the upper sepal; lower division bent downward, linear-attenuate and somewhat coiled at the tip: labellum deeply 3-parted; the middle lobe ligulate, slightly thickened, 11 to 13 mm. long, obtuse; lateral divisions linear-attenuate, 2.5 cm. long, more or less spirally coiled at the free ends: spur clavate, free, 4 to 4.5 cm. long: column bearing fleshy oblong appendages at the base: ovary narrowly winged. — MEXICO. State of Guerrero: mountains near Iguala, 15 September, 1900, *C. G. Pringle*, no. 9248 (hb. Gr.).

The affinity of this species is with *Habenaria jaliscana*, Watson, and *H. leucæcapensis*, Fernald. From the former it is readily distinguished by the height, the longer leaves, the longer spur, and by the entire absence of the falcate character of the lateral divisions of the labellum; and from the latter it differs in having much longer and narrower leaves.

CORALLORHIZA INVOLUTA, Greenm., Proc. Am. Acad. xxxiii. 474. Specimens secured by Mr. C. G. Pringle on hills near Amozoc, State of Puebla, MEXICO, at an altitude of 2600 m., 10 September, 1901,

no. 9632 (hb. Gr.), agree in all essential characters with the type of the above species, which was collected in the State of Oaxaca. The specimens obtained in Puebla, however, represent a more advanced stage of development, the plants being 3.5 dm. high, and the oldest flowers are reflexed, showing the immature 1.5 cm. long capsule.

Hexalectris mexicana. Glabrous and purplish throughout: stems 1 to 4.5 dm. high, bearing below 2 to 4 short sheathing bracts, simple and terminating in a racemose inflorescence: floral bracts ovate, 6 to 12 mm. long, short-acuminate, acute, one-half to one-third shorter than the ovary: flowers purple, at first erect-ascending, later reflexed; lateral sepals oblong-lanceolate, 12 to 14 mm. long, 4 to 6 mm. broad, obtuse, somewhat falcate, 5-nerved, upper sepal oblong-lanceolate, 14 to 18 mm. long, 4 to 5 mm. broad, obtuse; lateral petals oblong-oblanceolate, 12 to 16 mm. long, obtuse and slightly oblique: labellum obovate in general outline, rather deeply 3-lobed, abruptly narrowed at the base into a distinct claw, 5-nerved from the base, bearing a pair of partially united lamellæ on either side opposite the lateral sinus; lateral lobes obliquely ovate, obtuse; terminal lobe oblong-cuneate, 10 to 12 mm. long, rounded or retuse at the apex: immature capsule 12 to 16 mm. long, 8 to 10 mm. broad. *Hexalectris aphylla*, Hemsl. Biol. Cent.-Am. Bot. iii. 213 in part, not *Bletia aphylla*, Nutt.; Watson, Proc. Am. Acad. xviii. 159, excluding synonym. *H. aphyllus*, W. J. Robinson, Torreya. iii. 120 in part, as to plant of Schaffner. — MEXICO. State of San Luis Potosi: in mountains near San Miguelito, *Shaffner*, no. 316 (516?) (hb. Gr.); region of San Luis Potosi, altitude 1800–2400 m., *Parry & Palmer*, no. 861 (hb. Gr.). State of Coahuila: Sierra Madre, 6.5 kilometres south of Saltillo, July, 1880, *Palmer*, no. 2006 (hb. Gr.). State of Chihuahua: cañons of Sierra Madre, 5 October, 1887, *Pringle*, no. 1514 (hb. Gr.). State of Oaxaca: Cerro de Huauclilla, altitude 2500 m., 20 June, 1901, *Conzatti & González*, no. 1255 (hb. Gr.).

With the exception of the last, all the above cited specimens have been hitherto regarded as identical with *Hexalectris aphylla*, Raf., but all the Mexican material thus far examined by the writer proves to be quite distinct from that species. *Hexalectris mexicana* differs from *H. aphylla*, Raf., in its somewhat smaller average size, slightly smaller flowers, less conspicuously nerved parts of the perianth, shorter, smaller and more deeply 3-lobed labellum. The labellum, moreover, in *H. mexicana* bears only 2 to 4 lamellæ and these are opposite the lateral sinuses; while in *H. aphylla* the labellum is 5-(6-)lamellate from below the lateral sinuses, and the median fold is more or less continuous to the apex of the middle lobe.

BLETIA MACRISTHMOCHILA, Greenm., Proc. Am. Acad. xxxii, 297. Flowering and fruiting specimens of this attractive orchid were secured by Mr. C. G. Pringle during the past season, on banks of ravines near Guadalajara, MEXICO, no. 8640 (hb. Gr.). From Mr. Pringle's recently collected material it may be noted that the mature capsule is about 5 cm. in length and 1 cm. in diameter.

Celtis platycaulis. Fruticose : stems and branches flattened, covered with a reddish-brown bark, bearing single, curved, 5 to 6 mm. long spines : leaves ovate to obovate, 3 to 5 cm. long, 1.5 to 3 cm. broad, acute to rounded at the apex, usually serrate from near or just above the middle to the apex, entire in the lower half, rarely entire from base to apex, 3-nerved, in the very young stages puberulent, but soon becoming glabrous or essentially so; petioles 4 to 5 mm. long, and as well as the ultimate branches puberulent: the cymose inflorescences of the male flowers twice or more exceeding the petioles : fertile flowers few, borne at the tips of the branches; ovary puberulent; style branches bifurcated: mature fruit not seen. — MEXICO. State of Morelos : volcanic hills near Yantepec, altitude 1230 m., 5 July, 1901, *C. G. Pringle*, no. 8535 (hb. Gr.).

OXYBAPHUS VISCOSUS, L'Her., in Willd. Sp. i. 185; Choisy in DC. Prodr. xiii. 2, 430. Specimens collected by Mr. C. G. Pringle at Tehuacan, MEXICO, 1901, no. 8600 (hb. Gr.), agree in all important characters with typical representatives of the above species. In Mr. Pringle's specimens, however, the perigonium is considerably larger than is described and figured for *O. viscosus*, L'Her.; but this slight difference is supplemented by no other evident character, hence it seems best for the present at least to regard the Pringle plant as a mere form of the species here mentioned.

Ribes Dugesii. A much-branched shrub : stem covered with reddish-brown bark, glabrous; branchlets finely pubescent : leaves petiolate, ovate-rotund, shallowly 3–5-lobed, doubly crenate-serrate, 3–7-nerved from a cordate base, green and glabrous above, paler and somewhat glandular-pubescent beneath, especially on the prominent nerves; petioles 1 to 3 cm. long, and as well as the inflorescence minutely puberulent with stipitate glands intermixed, dilated at the base into a more or less glandular-ciliate expansion : racemes pedunculate, borne at the ends of young terminal branches and lateral shoots, 3 to 6 cm. long, suberect or somewhat drooping; pedicels 1 to 10 mm. long, jointed above, naked or bibracteate at the joint : flowers 1 cm. or less long : calyx subcampanulate, white or more or less roseate, 5-lobed for about one-half its length;

lobes oblong, 3 to 4.5 mm. long, slightly inflexed at the acutish tip, in the later stages recurved: petals subreniform, entire, 2 mm. long, equally broad, white: stamens as long as the petals; filaments about equalling the anthers: ovary glabrous: mature fruit not seen. — MEXICO. State of Guanajuato: mountains of Santa Rosa near the City of Guanajuato, March, 1901, and 1902, *Professor Alfredo Dugès*, no. 352*a* (hb. Gr.).

In the leaf-outline *R. Dugesii* suggests *R. viscosissimum*, Pursh, of western North America; but the two species have quite different flowers and pubescence. The affinity of *R. Dugesii* is evidently with *R. campanulatum*, Humb. & Bonpl. in Roem. & Schultes, Syst. v. 500 (1819); it differs, however, from this species in the character of the petioles, and in the absence of a hirsute pubescence on the under leaf-surface. From *R. ciliatum*, Humb. & Bonpl. l. c. (*R. jorullense*, HBK. Nov. Gen. & Sp. vi. 61) *R. Dugesii* is readily separated by the more rotund, less deeply and more obtusely lobed leaves.

Cassia longicoma. Stems herbaceous, erect or nearly so from a ligneous base, 1 to 3 dm. or more high, and as well as the petioles and peduncles pubescent with short reflexed hairs with which are intermixed long horizontally spreading pilose hairs: leaves 6-foliolate; petioles 1.5 to 3.5 cm. long; stipules linear-setaceous, 4 to 9 mm. in length, pubescent; leaflets short-petiolulate, oblong or obovate-oblong, more or less oblique, 1 to 4 cm. long, 0.5 to 2 cm. broad, rounded or obtusish at the apex and short-mucronate, entire, densely appressed-pubescent on both surfaces: peduncles axillary, 4 to 7.5 cm. long, mostly 3-flowered; pedicels about 1 cm. long: flowers nodding or erect, 1.5 to 2 cm. in diameter when fully expanded; sepals oblong, 8 mm. long, 3 mm. broad, obtuse or rounded at the apex, the outer surface pubescent; petals yellow, obovate, narrowed at the base into a short claw, rather conspicuously 3–5-nerved from the base; perfect stamens 7, subequal; staminodia 3; ovary densely sericeous-pubescent: legume 6 to 8 cm. long, 5 to 6 mm. broad, appressed-pubescent with somewhat scattered hairs: seeds ovate, short-acuminate, 3 to 4 mm. in length, slightly corrugate-pitted, and with a single central rather deep pit on either surface. — MEXICO. State of Morelos: Jojutla, altitude 1000 m., 12 June, 1901, and 30 August, 1902, *C. G. Pringle*, nos. 9674, 8665 (hb. Gr.).

Cassia morelensis. Fruticose: stem and branches covered with a grayish bark: ultimate branchlets terminating in a rather firm spine, glabrous or sparingly appressed-puberulent: leaves small, including the canaliculate subappressed-puberulent petiole 8 to 12 mm. long; leaflets 3–4-paired, short-petiolulate, obovate or oblong-obovate, 3 to 5 mm. long,

two-thirds as broad, submucronate, essentially glabrous on both surfaces, or distinctly appressed-puberulent beneath: inflorescence paniculate or terminating the lateral branches in few-flowered corymbose clusters: flowers large, 5 cm. in diameter when fully expanded: sepals glabrous, strongly unequal, the larger about 1 cm. long, ovate-subrotund or slightly oblong, the smaller ovate-oblong, about 5 mm. in length, somewhat boat-shaped: petals yellow, obovate-oblong to distinctly oblong, 2.5 cm. long, 1.5 cm. broad, abruptly narrowed at the base into a 3 mm. long claw, 3-nerved from the base: stamens unequal: ovary glabrous, many-ovuled: legumes 2 dm. long, about 8 mm. wide, reticulate-veined, glabrous, somewhat granulose or dotted with minute blisters. — MEXICO. State of Morelos: near Jojutla, altitude 3000 feet, 12 May, 1901, *C. G. Pringle*, no. 9642 (hb. Gr.).

The affinity of the species here proposed is clearly with *C. Galeottiana*, Mart. & Gal., from which, however, it is distinguished by the armed character of the lateral branches, the smaller, nearly or quite glabrous leaflets, the appressed nature of the pubescence, and finally by the elongate-linear not oblong legume.

Desmodium Seatoni. *D. subsessile*, Seaton, Proc. Am. Acad. xxviii. 118 (1893), not Schlecht., in Linnæa, xii. 319.

Desmodium xylopodium. Stems several from a suffruticose base, ascending or suberect, 3 to 6 dm. in length: leaves unifoliolate; petioles 4 to 8 mm. long, and as well as the stem uncinulate-hispidulous; stipules obliquely ovate, acute, strongly nerved, caducous; the single terminal leaflet ovate to oblong, 8 to 27 mm. long, 5 to 15 mm. broad, rounded or retuse and often mucronate-apiculate at the apex, entire, slightly revolute-margined, rounded or subcordate at the base, nearly or quite glabrous above, prominently veined and slightly puberulent beneath; stipels subulate, persistent; petiolules scarcely more than 1 mm. in length: inflorescence racemose or paniculate, terminating the stem; pedicels slender, usually in pairs, 6 to 8 mm. long; bracts caducous: flowers small, about 5 mm. long, purple: legumes at first minutely puberulent, later becoming glabrous, 1–2-jointed; joints suborbicular or slightly oblong, 3 to 4 mm. long, nearly or quite as broad, rather strongly reticulate-veined. — MEXICO. State of Jalisco: near Guadalajara, altitude 1500 m., 13 May, 1901, *C. G. Pringle*, no. 9657 (hb. Gr.).

The affinity of this species seems to be with *Desmodium guadalajaranum*, Watson, from which it is readily distinguished by the smaller leaflets, and by the absence of spreading or subvillous hairs on the leaf-surface.

Croton flavescens. Fruticose, 2 to 2.5 m. high: stem branched, covered with a brownish bark; ultimate branches subangular-compressed, finely stellate-pubescent: leaves alternate, petiolate, ovate to somewhat rhombic-ovate, 4 to 13 cm. long, 3 to 7.5 cm. broad, subrotund to acuminate at the apex and terminated by a mucro, cordate to obtuse at the base, stellate-pubescent on both surfaces more densely so beneath, yellowish-green; petioles 1 cm. or less in length: inflorescence terminating the branchlets in monœcious spicate racemes, 5 to 6 cm. in length: pistillate flowers clustered at the base of the spike; calyx-divisions triangular-ovate, acute; style-branches deeply 2-parted, strongly recurved over the densely stellate-pubescent ovary: capsule nearly or quite 1 cm. long, 8 to 9 mm. in diameter, obtusely 3-angled, somewhat verrucose, closely stellate-pubescent; carpels slightly compressed above: seeds elliptic-oblong, 6 mm. long, 3 mm. broad, smooth; caruncle 1.5 mm. broad, 2-lobed. — MEXICO. State of Michoacan: volcanic hills, Monte Leon Station, altitude 1540 m., 29 August, 1902, *C. G. Pringle*, no. 8667 (hb. Gr.).

In general aspect *C. flavescens* resembles certain forms of *C. morifolius*, Willd., but it is readily distinguished by the longer less globose and more distinctly triangular capsule. The branches of the stellate hairs in *C. flavescens* are shorter than in *C. morifolius*, and the tomentum is more or less deciduous revealing the subverrucose character of the surface of the capsule.

Croton Gonzalezii. Fruticose: stem and branches covered with a grayish bark; branchlets cinereous-stellate-pubescent: leaves short-petiolate, ovate, 2 to 4 cm. long, one-half as broad, mostly acuminate, obtuse and short-mucronate, inconspicuously denticulate, rounded or subcordate at the base, at first minutely stellate-pubescent on both surfaces especially beneath, later glabrate, 3–5-nerved from the base; petioles 2 to 5 mm. long, densely stellate-pubescent: inflorescence terminating the stem and branches in monœcious 1.5 to 3 cm. long spicate racemes; bracts about 1 mm. long, acute, spreading and persistent: calyx at first stellate-pubescent, later glabrate: petals elliptic-oblong, narrowed and ciliate at the base, 1-nerved: stamens about 14; filaments glabrous: capsule 5 mm. long, closely stellate-pubescent. — MEXICO. State of Oaxaca: Cuicatlan, altitude 600 m., 16 September, 1899, *C. V. González*, no. 980 (hb. Gr.).

In general habit *Croton Gonzalezii* resembles *C. Sonoræ*, Torr. (*C. Pringlei*, Watson), but differs markedly in the finer stellate tomentum of leaves and fruit, and in the shorter petioles.

Acalypha oreopola. Stem branched, purplish, bifarious-puberulent: leaves petiolate, ovate, 1.5 to 5 cm. long, 1 to 3 cm. broad, acuminate, acute, shallowly serrate-dentate, short-cordate, glabrous upon both surfaces, pellucid-punctate, 3–7-nerved; petioles 0.5 to 3 cm. long, canaliculate, crisp-puberulent, purplish: inflorescence in terminal or axillary rather remotely flowered glabrous spikes: bracts of the fertile flowers 2 to 3 mm. long, glabrous and pellucid-punctate, 3–6-lobed with triangular-acute lobes, 1–3-flowered: calyx deeply 3-parted; divisions ovate, acute, sparingly pubescent: ovary hirsute above; styles pectinately divided: capsule triangularly and obtusely 3-lobed, about 2 mm. long, muricately hispid above: seeds about 1 mm. long, smooth. — Mexico. State of Guerrero: mountains near Iguala, 10 October, 1900, *C. G. Pringle*, no. 9265 (hb. Gr.).

Jatropha Pseudo-Curcas, Muell. Arg. in Linnæa, xxxiv. 208, and in DC. Prodr. xv. 2, 1080; Hemsl. Biol. Cent.-Am. Bot. iii. 108. Specimens agreeing well with the description of this species were collected by *C. Conzatti* and *V. González* at Cercanias de Oaxaca, State of Oaxaca, altitude 1550 m., June, 1901, no. 1207 (hb. Gr.). The leaves in the specimens secured by Señors Conzatti and González are somewhat larger than is ascribed to the species by Mueller, having in many cases leaves fully 2 dm. long and nearly or quite as broad. The fruit characters, which seem not to have been recorded hitherto, may be here presented, as follows: capsule oblong, 2 to 2.5 cm. long, 1 to 1.5 cm. in diameter, abruptly short-acuminate, subtriangular, smooth and glabrous: seed oblong-elliptic, rather conspicuously carunculate, smooth and shining.

Manihot caudata. A small tree, 4 to 5 m. high: stem covered with a brown or grayish-brown cortex: branches leafy at the summits: leaves alternate, petiolate, ovate-rotund in general outline, cordate, palmately and deeply 3–7-lobed, pale green and glabrous on both surfaces; lobes or divisions obovate to oblong, 3 to 9 cm. long, 2 to 4.5 cm. broad, abruptly and conspicuously caudate-acuminate, entire; the outer lower lobes more or less oblique and usually horizontally spreading; petioles 8 to 14 cm. long, terete or slightly canaliculate, and as well as the peduncles, pedicels and lower leaf-surface near the nerves more or less glaucous: racemes short, axillary, 5 to 6 cm. long in the fruiting stage; pedicels 1.5 to 3 cm. long: capsule 18 to 22 mm. in length: seeds oblong, flattened, 12 to 15 mm. long, 8 to 12 mm. broad, more or less mottled with brown or brownish-black subhorizontal markings; caruncle broader than long. — *Manihot* ———?, Watson, Proc. Amer. Acad. xxi. 440. —

Mexico. State of Chihuahua: Hacienda San Miguel near Batopilas, September, 1885, *Dr. Edward Palmer*, no. 201 (hb. Gr.). State of Michoacan: volcanic hills, Monte Leon, 21 August, 1902, *C. G. Pringle*, no. 8687 (hb. Gr.).

Euphorbia Cumbræ, Boiss. Cent. Euph. 16, and in DC. Prodr. xv. 2, 48. Specimens agreeing in all details with this species, except that the glands of the involucre are either minutely appendaged or with the appendage wanting, were collected by Messrs. C. Conzatti and V. González in the State of Oaxaca, Mexico, altitude 1900 m., July–August, 1900, no. 1040 (hb. Gr.).

Euphorbia (§ **Hypericifoliæ**) **rubida.** An herbaceous perennial: stems several, slender, 1.5 to 2.5 dm. long, ascending from a stout ligneous base, somewhat dichotomously branched, terete, reddish, crisp-puberulent: leaves opposite, short-petiolate, oblong, 5 to 23 mm. long, 2 to 8 mm. broad, rounded at the apex, sharply serrulate, oblique and subcordate at the base, sparingly pubescent on both surfaces with fine spreading hairs, often reddish, especially beneath; petioles 1 to 2 mm. long: inflorescence terminating the stem and branches in rather close cymules: involucre small, 1 to 1.5 mm. high; glands 4, bearing narrow crenate-margined appendages, these as well as the involucre mostly deep red in color: capsule obtusely triangular, 2 mm. long, equally broad, pubescent with somewhat spreading crisp-pilose hairs: seeds oblong-ovate, 1 mm. long, subquadrangular, grayish, slightly rugulose on the surfaces. — Mexico. State of Mexico: dry ledges, Tultenango Cañon, 9 October, 1902, *C. G. Pringle*, no. 8673 (hb. Gr.).

E. rubida is perhaps most closely related to *E. Preslii*, Guss., but differs in having a distinctly perennial base, and in the pubescent character of the capsule.

Cuphea æquipetala, Cav., var. **epilosa.** Stems short-pubescent along decussating lines, not pilose-hispid. — Mexico. State of Puebla: on hills near Amozoc, altitude 2500 m., 10 September, 1901, *C. G. Pringle*, no. 9628 (hb. Gr.). The variety *epilosa* differs from typical forms of the species in the absence of the purplish pilose-hispid hairs commonly found on the stem.

Erythræa micrantha. An erect, much-branched annual, 4 to 5 dm. high, glabrous throughout: stem and branches somewhat 4-angled: leaves sessile; the lower oblong-elliptic, 2 cm. long, 6 to 7 mm. broad, obtuse, entire, 3-nerved; the upper leaves similar or slightly spatulate, gradually reduced on the stem above: inflorescence terminating the dichotomously branched stem and branches in a compound cyme: pedicels

0.5 to 1.5 cm. long: flowers small, in anthesis 5 to 6 mm. long: calyx 2 to 3 mm. long; lobes lance-linear, acute: corolla purplish or purplish-crimson in the dried state, 5-lobed; lobes oblong-ovate or somewhat rotund, 2 mm. long, 1 to 1.5 mm. broad: both calyx and corolla somewhat elongating with the maturing fruit: capsule about 7 mm. long, twice as long as the persistent calyx. — MEXICO. State of Jalisco: wet soil, near Guadalajara, altitude 1540 m., 12 May, 1901, *C. G. Pringle*, no. 8482 (hb. Gr.).

Lachnostoma gonoloboides. Stem twining, densely pubescent with soft spreading or sometimes slightly reflexed hairs: leaves petiolate, oblong-ovate to lanceolate or somewhat halberd-shaped, 5 to 8 cm. long, 2 to 3.5 cm. broad, acuminate, acute, entire, cordate at the base with a broad open sinus, hirsute-pubescent on both surfaces, and especially on the prominent midrib and nerves beneath, dark green above, paler beneath; petioles 2 to 4 cm. long, pubescent: inflorescence axillary, umbellate; peduncles 12 to 15 mm. long; pedicels 2 to 3 cm. long: calyx divided nearly to the base; lobes oblong- to slightly rhombic-lanceolate, 8 to 12 mm. long, 3 to 4 mm. broad, obtuse or acutish, entire, externally hirsute-pubescent: corolla white, tubular or tubular-campanulate, 1.5 to 2 cm. high, pubescent in the throat; tube slightly exceeding the ovate obtuse externally pubescent greenish reticulate lobes: crown thickish, adnate to the corolla-tube, slightly crenate-margined: gynostegium 7 mm. high: fruit not seen. — MEXICO. State of Chihuahua: in the Sierra Madre, near Seven Star Mine, altitude 2450 m., 7 September, 1899, *Townsend & Barber*, no. 409 (hb. Gr.). A species with a distinctly gonolobus-like habit; but on account of the tubular-campanulate corolla, the elongated gynostegium, and the pendulous or somewhat oblique pollen-masses the plant is placed rather under the genus *Lachnostoma*.

IPOMŒA BARBATISEPALA, Gray, Syn. Fl. ii. pt. 1, 212. To this species are to be referred specimens collected in the State of Oaxaca, MEXICO, at an altitude of 1650 m., December, 1900, *Conzatti & González*, no. 1094 (hb. Gr.). The above species has been known hitherto only from the region of western Texas and Arizona.

IPOMŒA ORNITHOPODA, Robinson, Proc. Am. Acad. xxvii. 183. Specimens collected by Mr. C. G. Pringle in the Yantepec Valley, State of Morelos, MEXICO, altitude 1075 m., 17 June, 1901, no. 9645 (hb. Gr.), agree in all essential details with the original of the above species. The specimens from Yantepec Valley, however, show a considerable variation in the foliage, particularly as to the breadth of the leaf-lobes,

which are frequently 1.5 cm. broad. To this species is also to be referred Dr. Edward Palmer's no. 781 (hb. Gr.), from Agiabampo, State of Sonora, collected in 1890.

CUSCUTA EPITHYMUM, Murr., in L. Syst., ed. 13, 140. This European species, collected in the Valley of Mexico, altitude 2250 m., 27 June, 1901, by *Mr. C. G. Pringle*, no. 8514 (hb. Gr.), seems not to have been hitherto reported from Mexico.

Phacelia madrensis. Perennial, subacaulescent, hirsute-pubescent throughout, not glandular-viscid: leaves mostly clustered at the end of an ascending or erect rootstock, pinnatifid, 1 to 4 dm. long; segments 7 to 9, obovate or cuneate, coarsely and rather deeply toothed, 8 to 22 mm. long, 5 to 15 mm. broad, terminal segment somewhat larger, the lowermost remote: inflorescence equalling or exceeding the leaves: flowers scattered, mostly remote, on pedicels 8 to 16 mm. long: calyx of 5 slightly unequal lanceolate, acute, or obtusish sepals: corolla campanulate, 10 to 12 mm. in diameter, pale blue or whitish; tube about equalling the broad semirotund lobes; folds of the corolla-tube not diverging at their free tips, puberulent along their margins: filaments hirsute-pubescent: ovary conspicuously hirsute, about 16-ovulate; style divided nearly to the base. — MEXICO. State of Chihuahua: Sierra Madre, near Colonia Garcia, altitude 2300 m., 2 July, 1899, *Townsend & Barber*, no. 100 (hb. Gr.).

The species here described belongs to the section *Eutoca*, and is apparently most nearly related to *Phacelia rupicola*, Rob. & Fern., and *P. pimpinelloides*, Gray. From the former it differs in the foliar characters, the shorter pubescence, smaller calyx-lobes, and finally by the approximate not divergent folds of the corolla-tube. From the latter species, namely, *P. pimpinelloides*, Gray, the species here proposed is readily distinguished by the spreading not appressed pubescence.

Nama parvifolium. Low depressed annual, 0.5 to 1.5 dm. high, cinereus-hirsute-pubescent throughout: stems prostrate or ascending, more or less dichotomously branched: leaves broadly spatulate, or somewhat oblong-spatulate, 0.5 to 1.5 cm. long, 3 to 6 mm. broad, obtuse, entire, contracted below into a narrowly winged petiolar base: flowers axillary, solitary or in pairs on unequal frequently curved slender 2 to 5 mm. long pedicels: calyx deeply 4–5-parted; divisions linear, acutish, 4 to 5 mm. in length, not dilated at the tip, hirsute-pubescent with hairs of unequal length: corolla 8 to 10 mm. long, white, or somewhat violet, subequally 5-lobed: ovary pubescent: mature capsule oblong, obtusish, 4 mm. long, pubescent. — *Nama rupicolum*, Pav., acc. to Hemsl. Biol.

Cent.-Am. Bot. ii. 362, in part. *N. rupicola*, Gray, Proc. Am. Acad. viii. 284, & xviii. 119, in part, not Bonpl. acc. to Choisy. *N. origanifolia*, Gray, Proc. Am. Acad. v. 337, in part, not HBK. *N. dichotoma*, var. *parvifolia*, Torr. Mex. Bound. 147. — Mexico. State of Tamaulipas: de Santander à Victoria, *Berlandier*, nos. 834, 2254 (hb. Gr.); San Fernando to Jimeney, 26–27 February, 1902, *E. W. Nelson*, no. 6606 (hb. Gr., and hb. U. S. Nat. Mus.). State of Nuevo Leon: Monterey, *Eaton & Edwards* (hb. Gr.). State of Chihuahua: Santa Rosa, *Bigelow* (hb. Gr.). State of Coahuila: Soledad, *Palmer*, no. 2023 (Coll. of 1880, hb. Gr.); Valley of the Rio Grande, near Piedras Niegras, 19 April, 1900, *C. G. Pringle*, no. 9173 (hb. Gr.). Yucatan: without locality, *Schott* (hb. Gr.).

This species has been hitherto confused with *N. origanifolium*, HBK., and *N. rupicola*, Bonpl., which are both species with distinctly suffruticose stems, while *N. parvifolium* is an annual. From the former, namely, *N. origanifolium*, the species here proposed is readily distinguished by the broader leaves and larger flowers; and from the latter, namely, *N. rupicola*, by the cinereous-hirsute character of the leaves, not densely white-tomentose on the under surface, and by the larger flowers, lance-linear not spatulate calyx-divisions.

Cordia stellata. Shrub, much-branched; branchlets, as well as the foliage and inflorescence, densly covered with a canous-stellate tomentum: leaves petiolate, ovate, 2.5 to 10 cm. long, 1.5 to 8 cm. broad, obtuse, irregularly crenate-dentate, cuneate or subcordate at base, and the lamina usually short-decurrent on the petiole, densely canous-stellate-pubescent on both surfaces, paler and rather conspicuously reticule-nerved beneath; petioles 4 to 12 mm. long, channelled above, densely stellate-pubescent; inflorescence terminating the stem and branches in peduncu-late spherical heads, 1.5 to 2 cm. in diameter; peduncles 2 to 4 cm. long: calyx obovoid, 5 to 6 mm. long, somewhat inflated, shortly and obtusely 5-dentate: corolla white, more or less salver-shaped, or sub-campanulate; tube slightly exceeding the calyx; limb about 1 cm. in diameter, 5-lobed, strongly reticulate-veined. — Mexico. State of Oaxaca: altitude 615 m., 27 August, 1894, *L. C. Smith*, no. 147 (hb. Gr.); Cuicatlan, altitude 600 m., 16 September, 1899, *V. González* no. 983 (hb. Gr.); about 9.5 kilometers above Dominguillo, altitude 640 m., October, 1894, *E. W. Nelson*, no. 1646 (hb. Gr., and hb. U. S. Nat. Mus.).

In general aspect *Cordia stellata* resembles *C. Pringlei*, Robinson, with which species it has been hitherto confused. The entire plant,

however, is more canescent, the heads somewhat smaller, and the calyx and corolla shorter than in *C. Pringlei*. Moreover, the calyx-teeth in the species here proposed are not setaceous, but short and obtuse; on this character alone the two species can be readily separated.

Lippia chrysantha. Shrub, 1.5 to 2 m. high: stem much-branched, covered with grayish bark; ultimate branchlets hirsute-pubescent: leaves short-petiolate, lanceolate to lance-oblong, 2.5 to 8 cm. long, 1 to 3 cm. broad, acute or obtuse, finely and evenly crenate-dentate, cuneate or rounded at the base, rugose and hirsute-hispid above, soft-tomentose beneath, often showing tendency to become reflexed; petioles 5 mm. or less in length: inflorescence in axillary sessile crowded spikes, much shorter than the leaves, pubescent with spreading hairs intermixed with stipitate glands: floral bracts, lanceolate to somewhat oblanceolate, 6 to 7 mm. long, 2 to 2.5 mm. broad, acute: flowers solitary in the axils of the bracts, short-pedicellate: calyx 1 mm. long, 2-fid, pubescent with long pilose hairs; divisions entire or minutely 2-dentate: corolla 5 to 6 mm. long; tube slender, externally pubescent, gradually expanded above into a 4-lobed yellow or greenish-yellow limb: ovary and style glabrous. — MEXICO. State of Morelos: limestone hills near Yantepec, altitude 1385 m., 26 October, 1902, *C. G. Pringle*, no. 8679 (hb. Gr.).

A species well characterized by the sessile short inflorescences disposed in the axils of the upper leaves. *Lippia Chrysantha* is apparently most nearly related to *Lippia oaxacana*, Rob. & Greenm.

Stachys aristata. An herbaceous perennial: stem erect or ascending from a ligneous base, simple or branched, glabrous and more or less purplish below, puberulent above: leaves petiolate, triangular-lanceolate, 1.5 to 6 cm. long, 0.5 to 2.5 cm. broad, serrate-dentate, conspicuously aristate at the apex, cuneate to subcordate at the base and the lamina decurrent on the petiole, glabrous or slightly puberulent on both surfaces; petioles 0.5 to 4.5 cm. in length: verticillasters usually 6-flowered: calyx narrowly campanulate, puberulent; teeth subulate, nearly or quite equalling the calyx-tube: corolla light purple or whitish tinged with purple, somewhat maculate on the lower lip, about 1 cm. long, twice the length of the calyx; tube of the corolla projecting beyond the calyx; upper lip entire; lower lip 3-lobed: nutlets obovate, glabrous or slightly pubescent above. — MEXICO. State of Jalisco: on river-ledges, Falls of Guanacatlan, 6 August, 1902, *C. G. Pringle*, no. 8623 (hb. Gr.).

Stachys latipes. An erect or ascending herbaceous perennial: stem simple or branched, 2 to 3 dm. high, pubescent with scattered spreading stiff hairs: leaves oblong or slightly oblong-ovate, 1.5 to 3

cm. long, 1 to 1.5 cm. broad, obtuse, crenate-serrate, cuneate at the base into a flattish or narrowly winged ciliate petiole; petioles of the lower leaves nearly or quite equalling the blade, more or less continuous about the stem: verticillasters in the axils of the upper leaves, about 6-flowered: flowers 1 cm. long: calyx pubescent with spreading stiff hairs: corolla nearly twice exceeding the calyx, conspicuously 2-lipped; the 3-lobulate lower lip exceeding the galeate externally pubescent upper lip. — Mexico. State of Chihuahua: in the Sierra Madre, near Colonia Garcia, altitude 2450 m., 17 July, 1899, *Townsend & Barber*, no. 128 (hb. Gr.).

A species resembling in general habit *S. agraria*, Cham. & Schlecht., from which, however, it is readily distinguished by the oblong cuneate leaves, and by the mostly spreading not reflexed hairs of the stem.

Capsicum frutescens, Linn., var. **lanicaule.** Stems more or less densely lanate-villous-pubescent: leaves ovate to ovate-lanceolate, 3 to 8 cm. long, 1 to 3.5 cm. broad, mostly villous-pubescent especially along the midrib and lateral veins beneath; petioles 0.5 to 3 cm. long: flowers solitary, axillary, nodding in anthesis: fruit oblong or oblong-lanceolate, 2 to 3 cm. long, 1 to 1.2 cm. in diameter. — Mexico. State of Oaxaca: altitude 1550 m., 5 September, 1899, *V. González*, no. 975 (hb. Gr.). State of Jalisco: near Guadalajara, September, 1886, *Dr. Edward Palmer*, nos. 639, 640, 642 (hb. Gr.).

Señor González's specimens, on account of the copious pubescence of stem and foliage, seem at first sight to represent a distinct species, but the examination of a series of specimens representing *Capsicum frutescens*, L., shows very clearly that this species is sometimes rather conspicuously pubescent, hence it has seemed best for the present at least to regard the González plant as a variety to which may be referred, as somewhat less pubescent forms, the above numbers collected by Dr. Palmer.

Brachistus Pringlei, Watson, Proc. Am. Acad. xxv. 159. Hereto should be referred specimens collected at Santa Rosa, Department of Santa Rosa, Guatemala, altitude about 1000 m., *Heyde & Lux*, nos. 3436, 4545 (exsic. John Donnell Smith), distributed as "*Capsicum frutescens*, L." The Guatemalan specimens here cited are somewhat less pubescent than in typical *B. Pringlei*, but in all essential characters they accord well with the original or type of that species. From descriptions of *B. diversifolius*, Miers, the *B. Pringlei* must be very closely related if indeed it does not represent the same species; but until a comparison of the original specimens of the two species can be made, it would not

be wise to suggest more than a close relationship of the two described species.

Solanum polyadenium. Pubescent throughout with hirsute spreading hairs intermixed with densely crowded stipitate glands, heavy scented: tubers white: stems somewhat striate-angled: leaves pinnatisect, 5 to 12 cm. long, 4 to 8 cm. broad, usually auricled at the base by small subfalcate leaves of reduced axillary branches; segments 7 to 9, lance-oblong to ovate, 1.5 to 4 cm. long, 0.5 to 2 cm. broad, somewhat acuminate, obtuse, abruptly contracted below into an oblique subpetiolulate base; intermediate segments much smaller, very unequal, rarely more than a centimeter in length: inflorescence terminating the stem and branches in pedunculate false dichotomous more or less horizontally spreading cymes: flowers several: peduncles 1 to 2.5 cm. long, jointed: calyx 5-parted; segments sublanceolate to somewhat oblong, often abruptly contracted into an attenuated apex, persistent: corolla 5-angled, plicate, about 1 cm. high and 2 cm. broad, white: ovary and style glabrous: fruit conical-ovate, 10 to 13 mm. long, two-thirds to nearly as broad, glabrous. — MEXICO. State of Hidalgo: limestone hills, El Salto Station, 15 September, 1902, *C. G. Pringle*, no. 8692 (hb. Gr.).

Seymeria integrifolia. A much-branched annual, glabrous or slightly puberulent under a lens, somewhat viscid: leaves mostly opposite, linear to subulate-linear, 0.5 to 1.5 cm. long, about 1 mm. broad, entire, glabrous: flowers small, 7 to 8 mm. long, during anthesis nodding on slender naked recurved pedicels: calyx about one-half as long as the fully developed corolla, deeply 5-parted into 5 lance-linear acutish lobes: corolla glabrous; lobes ciliate. — MEXICO. State of Jalisco: on rocky hills near Guadalajara, 13 May, 1901, *C. G. Pringle*, no. 9660 (hb. Gr.).

STENANDRIUM BARBATUM, Torr. & Gray, Pacif. R. Rep. ii. 168, t. 4; Torr. Bot. Mex. Bound. 122. Specimens of this species were collected by Mr. C. G. Pringle on dry hills near Ciudad Juarez, State of Chihuahua, Mexico, at an altitude of 1140 m., 5 May, 1901, no. 8501 (hb. Gr.). Although this species is well known from Texas and New Mexico, through the collections of *Wright*, *Thurber*, *Pope*, *Lemmon*, and *Vasey*, yet it does not seem to have been hitherto reported from Mexico.

Anisacanthus Gonzalezii. Suffruticose: stem much-branched, below covered with a grayish bark, above striate and finely appressed-sericeous-pubescent to nearly glabrous: leaves opposite, short-petiolate, ovate-lanceolate, 2 to 4 cm. long, 0.5 to 1.5 cm. broad, acuminate,

obtuse, entire, glabrous above, usually pubescent along the midrib and lateral veins beneath: inflorescence terminating the stem and branches in leafy-bracted racemose cymes: flowers 1 to 3 in the axils of the bracts: calyx 5-parted to below the middle; tube glabrous; lobes lance-attenuate, 4 to 5 mm. long, ciliate, otherwise glabrous: corolla scarlet, subcylindrical, 3 to 3.5 cm. long, 2-lipped to about one third its length, pubescent on the outer surface: ovary glabrous. — Mexico. State of Oaxaca: Cuesta de Quiotepec, altitude 1200 m., 3 August, 1895, *L. C. Smith*, no. 695 (hb. Gr.); near Oaxaca City, *Conzatti & González*, June, 1900, no. 1231 (hb. Gr.).

The specimens collected by Mr. L. C. Smith, in the Gray Herbarium, were referred to *Anisacanthus virgularis*, Nees, from which species, however, *A. Gonzalezii* differs in having the pubescence of the stem scattered over the entire surface instead of restricted to definite lines, usually broader leaves which are pubescent along the midrib beneath instead of glabrous, and finally by having a glabrous instead of usually glandular calyx.

Dicliptera inequalis. Stem hirsute-pubescent, with glandular hairs intermixed especially throughout the inflorescence: leaves petiolate, ovate, 3 to 8 cm. long, 1 to 5 cm. broad, acuminate, acute, entire, narrowed at the base into the 0.5 to 2 cm. long petiole, hirsute-pubescent on both surfaces, somewhat paler beneath: inflorescence an elongated racemose-paniculate cyme: the flowers in small heads or floral clusters, terminating the primary and secondary branches and either subsessile or on peduncles 3 cm. or less in length: outer bracts of the involucre, unequal, lanceolate, acute; the inner bracts linear-lanceolate, acute, exceeding the 5-parted calyx: divisions of the calyx lanceolate, acute, about 3 mm. long, longer than the tube: corolla 12 to 20 mm. long, purplish or dark red; tube about twice exceeding the lip: fruit not seen. — Mexico. State of Morelos: at Cuantla, near Cuernavaca, altitude 1250 m., 30 May, 1901, *C. G. Pringle*, no. 9665 (hb. Gr.).

Dicliptera nervata. Stem and branches obscurely hexagonal, sparingly pubescent: leaves ovate, including the petiole 3 to 6 cm. long, 1 to 2.5 cm. broad, short-acuminate, obtuse or acute, entire, narrowed at the base into a rather short petiole, sparingly pubescent on both surfaces: inflorescence in densely crowded axillary verticillasters: involucre 1-flowered; the two outer bracts of the involucre obovate to obovate-rotund, about 1 cm. long and two-thirds to equally broad, retuse and not unfrequently apiculate, entire, ciliate, pubescent with a few scattered hairs on the outer surface, glabrous on the inner surface, rather con-

spicuously nerved; the two inner bracts of the involucre narrowly lanceolate, slightly exceeding the deeply 5-parted calyx: divisions of the calyx lance-attenuate, inconspicuously ciliate: corolla about 1 cm. long, divided to near the middle: capsule 5 mm. in length, sparingly pubescent: seeds somewhat hispid over the entire surface. — MEXICO. State of Morelos: Cuernavaca, 8 January, 1866, *Bilimek*, no. 344; Cuantla, near Cuernavaca, altitude 1230 m., 31 May, 1901, *C. G. Pringle*, no. 9664 (hb. Gr.).

Jacobinia mollis. Fruticose: ultimate branches densely hirsute-pubescent: leaves petiolate, ovate to ovate-lanceolate, 2 to 9 cm. long, 1 to 4 cm. broad, short-acuminate or little narrowed toward the apex, obtuse or acute with a small mucro, entire or slightly repand, narrowed below into a 0.5 to 1.5 cm. long pubescent petiole, ciliate, dark green and hirsute-pubescent above, paler and subtomentose beneath: inflorescence in short axillary pubescent racemes, shorter than the leaves; bracts and bracteoles triangular-acute, shorter than the 5 to 6 mm. long, closely puberulent calyx; calyx-tube 1.5 mm. long, the posterior lobe much smaller than the other lobes, subulate: corolla 3.5 to 3.7 cm. long, purplish, 2-lipped for about one-half its length, pubescent on the outer surface; upper lip entire or slightly emarginate; lower or anterior lip shortly 3-lobed: style puberulent: mature capsule not seen. — MEXICO. State of Oaxaca: June, 1901, *Conzatti & González*, no. 1229 (hb. Gr.).

Jacobinia oaxacana. Fruticose: stem below covered with a grayish bark; branches and branchlets pubescent at the nodes and along descending lines between the nodes: leaves petiolate, ovate to ovate-lanceolate, 3 to 10 cm. long, 1.5 to 4 cm. broad, usually acuminate, obtusish or apiculate-acute, entire or slightly crenate, ciliate, green and glabrous above except on the nerves, paler and densely pilose on the conspicuous midrib and lateral nerves beneath, narrowed below into a ciliate 0.5 to 2 cm. long petiole; cistoliths lineate; inflorescence in axillary pedunculate few-flowered racemes, mostly shorter than the leaves; bracts and bracteoles small, triangular, acute, shorter than the calyx: flowers sessile: calyx deeply 5-parted, externally puberulent; tube 1 to 1.5 mm. long; lobes lanceolate, acute, the antero- and postero-lateral lobes about 4 mm. long, equal; the posterior lobe much smaller, subulate: corolla 3 cm. long, purple; tube equalling or slightly exceeding the limb; upper posterior lip entire or slightly emarginate, the lower anterior oblong, with short ciliated lobes: style puberulent: mature fruit not seen. — MEXICO. State of Oaxaca: June, 1901, *Conzatti & González*, no. 1230 (hb. Gr.).

RONDELETIA LEUCOPHYLLA, HBK., var. **calycosa.** Habit and foliar characters of the species: inflorescence much contracted, subcapitate; bracts 7 to 12 mm. long, 3 mm. or less broad, acute: calyx-lobes subequal, subfoliaceous, lance-oblong, 6 to 8 mm. long, 1 to 2 mm. broad, obtuse or obtusish.—MEXICO. State of Oaxaca: altitude 1650 m., December, 1900, *Conzatti & González*, no. 1127 (hb. Gr.); City of Oaxaca, altitude 1550 m., *Conzatti*, no. 970 (hb. Gr.). No differences other than the broader bracts of the inflorescence and the larger subfoliaceous calyx-lobes are found to distinguish the variety from the species.

The variety *calycosa* is cultivated in the Botanical Garden of the City of Oaxaca where it grows as a very graceful and decorative shrub.

Bouvardia Conzattii. Shrub: stem and branches covered with a grayish bark; ultimate branchlets smooth and glabrous or minutely puberulent: leaves opposite, ovate to ovate-lanceolate, 1.5 to 4 cm. long, 0.5 to 2 cm. broad, obtuse to subacuminate-acute, entire, slightly hirtellous on the margins, yellowish-green and puberulent above, paler and sparingly puberulent on the midrib and obliquely arched conspicuous lateral veins beneath, abruptly narrowed at the base into short densely puberulent 2 mm. long petioles; stipules lanceolate, 3 to 7 mm. long, lacerate-dentate: inflorescence terminating the stem and branches in close rather few-flowered corymbose cymes; bracts subulate, and as well as the unequal linear-acute 3 to 5 mm. long calyx-lobes, hirtellous-puberulent especially along the margins: corolla red or yellowish-red, 13 to 15 mm. long; tube cylindrical, glabrous on the outer surface, bearing within a ring of hairs one-third its length from the base; lobes short, ovate, acute, about 2 mm. long: stamens included; filaments adnate to the corolla-tube two-thirds its length from the base; anthers subsessile: style glabrous: mature fruit not seen. —MEXICO. State of Oaxaca: altitude 1750 m., July–August, 1900, *Conzatti & González*, no. 1076 (hb. Gr.).

Pæderia Pringlei. Stem woody, twining, 6 m. or more in length; ultimate branches subcompressed, glabrous: leaves opposite, petiolate, ovate or slightly ovate-oblong, 2.5 to 5 cm. long, 2 to 3 cm. broad, usually short-acuminate, acute, at first sparingly pubescent above, later more or less glabrate, hirsute-tomentulose beneath especially along the midrib and lateral nerves: flowers not seen: fruit elliptic-oblong, 10 to 12 mm. long, 6 to 8 mm. broad, smooth and glabrous, bearing above the persistent calyx-teeth; pyrenes separating by, and suspended on a filiform carpophore.—MEXICO. State of Morelos: lava fields near Yantepec, altitude 1385 m., 22 October, 1902, *C. G. Pringle*, no. 8682 (hb. Gr.).

VERNONIA VERNICOSA, Klatt, var. **comosa.** Stem striate, densely pubescent: leaves pubescent on both surfaces with subappressed-hirsute hairs, somewhat glabrate above: other characters of the species.—COSTA RICA. Buissons à Matambér près Nicoya, January, 1900, *Ad. Tonduz*, no. 13,607 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

Eupatoriastrum, n. gen. of *Compositæ* (*Agerateæ*). Heads homogamous, many-flowered. Involucre campanulate; bracts 2–3-seriate. Receptacle convex, chaff-bearing throughout. Corollas equal, regular, shallowly 5-toothed. Pappus of numerous minutely barbellate setæ, disposed in a single row. Achenes linear-oblong, 5-angled. Leaves opposite, petiolate, palmately nerved. Inflorescence in terminal leafy panicles.

E. Nelsonii. Stem striate, slightly puberulent, somewhat stramineous in color: leaves petiolate, remote, broadly ovate, 1 to 2 dm. or more long, 4 to 16 cm. broad, 5–7-nerved from or just above the base, acute or short-acuminate, denticulate to shallowly dentate, rounded at the base, conspicuously netted-veined, sparingly pubescent with scattered crisp hirsutish hairs on both surfaces; petioles 1 to 3 cm. long: heads 1 to 1.5 cm. high, on axillary pedunculate and terminal clusters forming a leafy panicle: involucral scales lance-oblong, acute, externally pubescent: receptacle chaffy throughout with narrow pales slightly broadened toward the tip: corolla a little constricted above the slightly ampliated tube: pappus about equalling the corolla: achenes hirtellous-puberulent along the angles. — MEXICO. State of Oaxaca: Santa Efigenia, altitude 150 m., 18 July, 1895, *E. W. Nelson*, no. 2827 (hb. Gr., and hb. U. S. Nat. Mus.).

In habit and in the character of the paleaceous receptacle this plant resembles *Schistocarpha*, but the style-branches are distinctly those of the subtribe *Agerateæ*, and closely resemble the style-branches in *Eupatorium* near which genus it is provisionally placed.

Stevia collodes. Shrub: ultimate branches reddish, puberulent: leaves linear, or linear-lanceolate, 1.5 to 3.5 cm. long, 1.5 to 3 mm. broad, obtuse, entire, glabrous on both surfaces: inflorescence terminating the stems and branches in few-headed umbellate-cymes: heads about 12 mm. high: involucral scales linear, 8 to 9 mm. long, acuminate, acute, obtusely keeled on the back and, as well as the leaves and young branches, glandular-viscid: flowers much exceeding the involucre: pappus coroniform, consisting of minute scales: corolla white, or slightly reddish-tinged, with a long slender glandular tube, and a rather deeply 5-lobed limb: achenes about 4 mm. long, slightly puberulent along the angles. —

Mexico. State of Puebla: calcareous hills near Tehuacan, altitude 1725 m., 22 August, 1901, *C. G. Pringle*, no. 8570 (hb. Gr.).

Archætogeron purpurascens. An herbaceous perennial, pubescent throughout with mostly appressed-hirsute hairs: stem erect or ascending, simple or branched, 2 to 4 dm. high: lower leaves oblanceolate, 2 to 6 cm. long, 3 to 10 mm. broad, obtuse, subentire to rather conspicuously toothed with remote spreading teeth, the uppermost leaves lanceolate and entire: heads terminating the stem and branches on rather long peduncles, including the rays about 2.5 cm. broad; involucral scales 2–3-seriate, narrowly lanceolate, acuminate, appressed-pubescent: ray-flowers in about 3 series, numerous, deep purple: disk-flowers numerous; pappus coroniform, of united more or less lacerated scales. — Mexico. State of Chihuahua: Sierra Madres, near Colonia Garcia, altitude 2450 m., 27 July, 1899, *Townsend & Barber*, no. 175 (hb. Gr.).

Erigeron adenophorus. Suffruticose: stem branched; branches hirsute, and more or less glandular-pubescent, leafy towards the tip: leaves sessile, crowded, amplexicaul, at first erect or spreading, later reflexed, linear-lanceolate, 1 to 2 cm. long, 2 to 5 mm. broad, mucronate-acute, sparingly dentate with minute spreading subcartilaginous teeth, densely glandular-pubescent intermixed with long jointed flaccid hairs; margins revolute: inflorescence terminating the stem and branches in dense round-topped corymbose cymes: heads about 1 cm. high: involucre campanulate; bracts 3–4-seriate, lance-linear, acute, the outer densely pubescent with long jointed subflaccid and somewhat matted hairs, the inner terminated by a glabrous purplish tip: ray-flowers mostly 2-seriate; achenes strongly compressed, with thick nerviform margins and a single nerve on either surface, puberulent; corolla-tube slender, puberulent, slightly ampliated and expanded above into a purplish minute inconspicuous ligule, or remaining essentially tubular; style included: disk-flowers numerous; the 5-toothed limb of the corolla deep purple at least in the dried state; achenes like those of the ray-flowers. — *Senecio eriocephalus*, Klatt, Bull. Soc. Bot. Belg. xxxi. 212 (1892), and Leopoldina xxxi. (1895) Beiblatt, p. 7. — Costa Rica. Entre le Rancho del Jaboncillal et le sommet de Cerro de Buenavista, et les roches, altitude 3100 m., 19 January, 1891, *H. Pittier*, no. 3425 (hb. Gr.).

A careful examination of the type of *Senecio eriocephalus*, Klatt, shows very clearly that the plant is widely remote from *Senecio;* its affinity is rather with *Erigeron* and *Conyza*. Because of the comparatively small number of ray-flowers and the character of the same, namely the included style, and the distinctly nerviform margins of the compressed achene, it

is placed under *Erigeron*. Owing to the several discrepancies between Klatt's published description and the original specimen an entirely new characterization is here drawn.

ERIGERON REPENS, Gray, Syn. Fl. i. pt. 2, 17. Specimens collected by Mr. C. G. Pringle on sand dunes near the City of Vera Cruz, Mexico, 22 June, 1901, no. 9673 (hb. Gr.), are clearly referable to the above species, hitherto known only from the sandy sea-coast of Texas and Louisiana.

Gnaphalium Altamiranum. Densely lanate-tomentose throughout: stem 1.5 to 2 m. high, much-branched above: leaves sessile, auriculate-clasping, lanceolate, 8 to 16 cm. long, 0.5 to 1.5 cm. broad, acuminate, acute, entire, 3-nerved, broadest near the base: inflorescence a many-headed compound corymbose cyme: heads during anthesis about 6 mm. high, nearly or quite as broad: involucre campanulate, usually 5-seriate; scales of the involucre whitish or pale-stramineous, the outer broadly ovate, obtusish, the inner narrowly oblong, obtuse: flowers numerous: perfect flowers about 10. — MEXICO. State of Morelos: mountains above Cuernavaca, altitude 2460 m., 2 February, 1899, *C. G. Pringle*, no. 8041 (hb. Gr.).

The species here proposed is allied to *Gnaphalium Wrightii*, Gray, but differs in having larger leaves, which are relatively broad at the base, and gradually narrowed to the tip, also by somewhat larger and more numerously flowered heads, and broader outer involucral scales.

Gnaphalium chartaceum. Stem erect, 1 to nearly 2 m. high, freely branching, glandular-hirsute: leaves sessile, round-auricled, half-clasping the stem, lanceolate to somewhat oblong-lanceolate, 3.5 to 8 cm. long, 0.5 to 2 cm. broad, acute to acuminate-acute, entire or slightly undulate-margined, hirsute or glandular-hirsute and somewhat arachnoid in the early stages, especially on the under surface, hirsute on the midrib beneath: inflorescence a terminal compound many-headed corymbose cyme: heads 5 to 6 mm. high: involucre subcampanulate; scales imbricated in 4 series, ovate, obtuse or obtusish, almost pure white or somewhat cream-colored, firm or chartaceous in texture: perfect flowers 15 to 25; pistillate flowers numerous. — MEXICO. State of Jalisco: on hillsides and banks near Guadalajara, 22 November, 1888, *C. G. Pringle*, no. 1827 (hb. Gr.), distributed as "*Gnaphalium decurrens*, Ives, var." State of Puebla: near Tehuacan, 22 December, 1895, *C. G. Pringle*, no. 7033 (hb. Gr.).

G. chartaceum is readily distinguished from *G. decurrens*, Ives, with which species it has hitherto been confused, by the sessile auriculate half-

clasping rather than decurrent leaves, the less lanate-tomentose nature of the under leaf-surface, the more glandular character of stem and foliage, and finally by the chartaceous, essentially white involucral scales.

Gnaphalium crenatum. Stem herbaceous, erect, 3 to 4 dm. high, branching from the base, leafy throughout, terete, white-tomentose with glandular-hirtellous hairs intermixed: leaves sessile, semiamplexicaul and often somewhat decurrent, spatulate to linear-lanceolate, 2.5 to 5 cm. long, 2 to 5 mm. broad, acute or mucronate-acute, more or less arachnoid and densely glandular-hirtellous above, lanate-tomentose beneath; margins revolute and mostly crenate: inflorescence a terminal corymbose cyme: heads about 5 mm. high, disposed in rather dense glomerules: involucre pale-stramineous, 4–5-seriate; scales of the involucre lanceolate, tomentose at the base and greenish along the median line, the outer acuminate, acute, the inner obtusish. — MEXICO. State of Jalisco: near Guadalajara, *C. G. Pringle*, no. 9524 (hb. Gr.).

The affinity of this species is apparently with *G. gracile*, and *G. stramineum*, HBK.

Gnaphalium jaliscense. Lanate-tomentose or densely arachnoid throughout: stem 5 to 7 dm. high, branched from near the base; branches arcuate-ascending, slender, usually simple: leaves narrowly oblanceolate to lance-attenuate, 3 to 8 cm. long, 2 to 8 mm. broad, acute, entire, commonly revolute-margined, short-decurrent: heads about 7 mm. high, disposed in few- to several-headed glomerules at the tip of stem and branches: involucre campanulate at least in the dried state; scales of the involucre white, narrowly ovate to elliptic-oblong, 3 to 5 mm. long, 1 to 2 mm. broad, acute or submucronate: flowers numerous: perfect flowers 20 to 30. — MEXICO. State of Jalisco: Guadalajara, July, 1886, *Dr. Edward Palmer*, no. 256 (hb. Gr.); gravelly soil near Guadalajara, 9 August, 1902, *C. G. Pringle*, no. 8628 (hb. Gr.).

Dr. Palmer's plant here cited was placed by the late Dr. Sereno Watson with *Gnaphalium semiamplexicaule*, DC., but with that species it has little in common. *G. jaliscense* differs from *G. semiamplexicaule* in having decurrent rather than half-clasping leaves, in having larger and more numerously flowered heads; and the scales of the involucre are more pointed and more numerously seriate.

Gnaphalium oaxacanum. Stem and branches densely white lanate-tomentose: basal leaves not seen: stem-leaves sessile, shortly decurrent, lance-attenuate, 2 to 5 cm. long, 2 to 6 mm. broad, entire, revolute-margined, arachnoid-tomentose above, densely white lanate-tomentose beneath, in the later stages becoming more or less recurved:

inflorescence corymbose; heads numerous, small, 3 mm. long, disposed in glomerules: involucral scales about 3-seriate, pale-stramineous, imbricated; the outer scales ovate, obtuse, brownish especially at the base, the inner linear-oblong or slightly oblanceolate, acutish: pistillate flowers about 14: perfect flowers few, usually two. — MEXICO. State of Oaxaca: altitude, 1750 m., — July–August, 1900, *Conzatti & González*, no. 1012 in part (hb. Gr.).

Gnaphalium oblanceolatum. Densely white lanate-tomentose throughout: stem erect, 4 to 5 dm. high, ligneous at the base, simple or branched, leafy: leaves sessile by a half-clasping base, oblanceolate, 2 to 7 cm. long, 0.5 to 1.5 cm. broad, entire, white lanate-tomentose on both surfaces or arachnoid above, also bearing on the upper surface crowded crisp hirsutish hairs: inflorescence terminating the stem and branches in a leafy corymbose panicle: heads crowded: involucre about 5 mm. high; scales imbricated, acute, pale yellow. — MEXICO. State of Oaxaca: Cerro de San Felipe, altitude 1800 m., 21 August, and 1st September, 1897, *Conzatti & González*, nos. 385 and 696 (hb. Gr.).

The species here proposed is described from young flowering specimens. In general appearance it approaches most closely *G. pannosum*, Gray, from which, however, it differs in the more leafy stem and in the oblanceolate leaf-outline.

GNAPHALIUM PURPUREUM, L., var. **macrophyllum.** Stem 6 dm. high, lanate-tomentose: leaves oblanceolate or oblanceolate-spatulate, 0.5 to 1.5 dm. long, 1 to 1.5 cm. broad, obtuse or submucronate-acute, arachnoid-pubescent above in the early stages and later glabrate, densely and permanently white-tomentose beneath: inflorescence racemose-paniculate: involucral scales brownish or with a green base and a rich brown tip. — COSTA RICA. El Copey, altitude 1800 m., February, 1898, *Ad. Tonduz*, no. 11,771 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

It is quite possible that the variety here proposed may prove eventually to represent a distinct species, but in the present confused state of the genus, particularly the subtropical species, it seems to the writer best to regard the above plant as a variety of *G. purpureum*, L., especially as its chief distinguishing characters are the size of the plant, the very large leaves, and the paniculate inflorescence.

Clibadium anceps. Small tree, much-branched: ultimate branches somewhat flattened, decussately 2-edged, minutely strigose-pubescent: leaves opposite, petiolate, ovate, 8 to 12 cm. long, 4 to 6 cm. broad, acuminate, acute, remotely denticulate, more or less revolute-margined, cuneate at the base, hirtellous-pubescent upon both surfaces, glabrate and somewhat

shining above, conspicuously 3–5-nerved: petioles 1.5 to 3 cm. long, and as well as the stem strigose-pubescent: inflorescence a terminal compound corymbose cyme: heads small, about 5 mm. high, disposed in glomerules: involucral bracts ovate, obtuse, appressed-cinereous-pubescent, the outer shorter: ray-flowers mostly 3: mature achenes obovate, about 2 mm. long, glabrous: sterile flowers few, 3 to 5. — Costa Rica. Forêts de La Palina, altitude 1459 m., 8 September, 1898, *Ad. Tonduz*, no. 12,537 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

Clibadium caracasanum, DC. Prodr. vi. 506. To this species the following collections may be referred: Venezuela. Tovar, *Fendler*, no. 640 (hb. Gr.). Panama. Gatun Station, *Sutton Hayes*, no. 89 (hb. Gr.). Costa Rica. Cañas Gordas, *H. Pittier*, no. 11,068 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

Clibadium glomeratum. Stem stout, densely soft-tomentose: leaves opposite, long-petiolate, ovate, 1 to 2 dm. long, 0.5 to 1.5 dm. broad, acute, crenately and somewhat unequally dentate, obtuse to subcordate at the base, scabrous-pubescent above, densely soft-pubescent beneath, 3-nerved from a point considerably above the base below which are two or three pairs of less conspicuous lateral nerves: inflorescence terminating the stem and branches in compound corymbose pubescent cymes: heads small, few-flowered, about 5 mm. high, disposed in dense glomerules 5–8 (–10) mm. in diameter: involucral scales oblong or ovate-oblong, 2 to 3 mm. long, glabrous, ciliate: ray-flowers mostly 5, in 1 to 2 series: mature achenes narrowly obovate, about 2 mm. long, glabrous below, villous-pubescent above. — Costa Rica. Forêts de Luis, altitude 650 m., November, 1897, *Ad. Tonduz*, no. 11,508 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

Clibadium Pittieri. Stem terete, appressed-pubescent: leaves opposite, petiolate, ovate, 1 to 1.5 dm. long, 4 to 8 cm. broad, acuminate, acute, dentate above the middle, entire and narrowed below into the 1 to 6 cm. long petioles, hirsute-pubescent upon both surfaces, 3–5-nerved from just above the base: inflorescence terminating the stem and branches in corymbose clusters: heads about 5 mm. high: involucre of narrowly ovate acute strigose-pubescent bracts: ray-flowers several in about three series: mature achenes obovate, 2 mm. long, glabrous at the base, pubescent at the apex. — Costa Rica. La Florida voie ferrée Atlantique, altitude 80 m., July, 1897, *H. Pittier*, no. 11,290 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.). In general habit this species approaches most closely *C. surinamense*, L., but is readily distinguished from it by the conspicuous hirsute pubescence of the upper leaf-surface,

the narrower and less striate involucral scales, and finally by the more numerous fertile flowers. From *C. fragiferum*, Griseb., which also has numerous disk-flowers, *C. Pittieri* differs in the more spreading pubescence of the leaves and in the less conspicuous pales of the receptacle.

Trigonospermum floribundum. Stem 2 to 3 m. high, purplish, striate, at first tawny puberulent later glabrate; branches and the many-headed compound corymbose cyme rather densely stipitate-glandular: leaves opposite, petiolate, broadly ovate, 0.5 to 1.8 dm. long, 2 to 14 cm. broad, acute, unequally cartilaginous-dentate, cuneate at the base into 1 to 5 cm. long petioles, densely subappressed-hispidulous-pubescent above, hirsute-tomentose beneath especially on the midrib and nerves, resiniferous-dotted on the surface, 3-nerved from just above the base: heads many, about 5 mm. high, 12 to 18 mm. in diameter including the rays: outer bracts of the involucre linear or linear-oblong, 4 mm. long, obtuse; inner involucral bracts broadly obovate, closely clasping the achene, appressed-puberulent: rays 5 to 8, yellow, 6 to 8 mm. long, somewhat fan-shaped, unequally dentate: mature achenes obovoid-triangular, smooth and shining. — MEXICO. State of Morelos: cliffs of the Sierra de Tepoxtlan, near Cuernavaca, altitude 2285–3000 m., 4 November, 1901, and 27 November, 1902, *C. G. Pringle*, nos. 9179, 8686 (hb. Gr.).

Polymnia Nelsonii. Stem striate, sparingly hirsute with horizontally spreading jointed hairs: leaves opposite, including the winged clasping petiole 1.5 to 2 dm. long, 1.2 to 1.5 dm. broad, mostly pinnately 5-lobed, thin, dark green above, paler beneath, sparingly pubescent on both surfaces; lobes ovate or rhombic-ovate, acuminate; margins remotely denticulate; petioles broadly winged, 0.8 to 2 cm. in breadth: heads about 3 cm. in diameter, on slender axillary 7 to 10 mm. long peduncles: involucre biseriate; bracts of the involucre oblong-lanceolate, 8 to 10 mm. long, sparingly hirsute, ciliate: ray-flowers 10 to 12; rays yellow. — MEXICO. State of Chiapas: near Santa Christobal, altitude 2150 to 2450 m., 18 September, 1895, *E. W. Nelson*, no. 3221*a* (hb. Gr., & hb. U. S. Nat. Mus.).

In general *P. Nelsonii* most closely resembles *P. oaxacana*, Schz. Bip. especially in foliar characters, but the yellow rays and the thin or membranous leaves and the sparing pubescence of the same readily distinguish it.

Rumfordia polymnioides. Stem purplish, striate, hirsute-pubescent: leaves opposite, subperfoliate, ovate, 0.5 to 1.5 dm. long, 2.5 to 8 cm. broad, acuminate, mucronate-acute, somewhat sinuate-dentate and bearing on the margins subcartilaginous mucronulations, abruptly nar-

rowed below the middle into a winged petiole continuous about the stem, pubescent on both surfaces, 3-nerved, paler and conspicuously reticulate-veined beneath: inflorescence a terminal flat-topped cymose corymb: heads 1 to 1.5 cm. high, 2 to 2.5 cm. in diameter when fully expanded: involucre 2-seriate; outer scales of the involucre foliaceous, ovate, 1 to 1.5 cm. long, two-thirds as broad, acute or slightly acuminate-acute, pubescent with crisp hirsutish hairs; inner scales of the involucre smaller, externally pubescent with glandular and hirsute hairs intermixed, more or less surrounding the glabrous ray-achenes: ray-flowers subbiseriate; rays small, inconspicuous, yellow: disk-flowers numerous; corolla-tube long, slender, externally pubescent, ampliated above into an elongated campanulate limb: achenes smooth and glabrous, slightly obovate-oblique, and more or less angular. — Costa Rica. Plantations de maïs du Copey, April, 1898, *Ad. Tonduz*, no. 11,947 (hb. Gr., & hb. Inst. Phys.-Geog. Cost. Ri.).

In general habit this species closely resembles the genus *Polymnia*, and more particularly *P. edulis*, Wedd., but the involucral characters and the perfect disk-flowers place it readily in the genus *Rumfordia*.

Montanoa macrolepis, Rob. & Greenm. Proc. Am. Acad. xxxii. 44, & xxxiv. 512. *Polymnia Liebmannii*, Schz. Bip. acc. to Klatt in Leopoldina xxiii. 89 (reprint, p. 2). A fragment and a good drawing of the original or type of *Polymnia Liebmannii*, collected by Liebmann at Cumbre de Estepa, Mexico, show very distinctly that the plant has its affinity rather with *Montanoa* than with *Polymnia*, and moreover is identical with the above species *Montanoa macrolepis*, Rob. & Greenm.

Gymnolomia microcephala, Less., Linnæa, v. 153. In the original description of this species it is stated that the heads are discoid, but an examination of the type specimen shows the heads to be distinctly radiate. A comparison of the type of *Gymnolomia patens*, Gray, with the original of *G. microcephala*, Less., also shows that the two plants are absolutely identical. The combination made by Dr. Gray thus becomes a synonym, and the varieties now under *G. patens* should be transferred to *G. microcephala*, Less., hence the synonymy briefly stated is as follows:

Gymnolomia microcephala, Less., l. c. *G. patens*, Gray, Proc. Am. Acad. v. 182; Hemsl. Biol. Cent.-Am. Bot. ii. 163; Rob. & Greenm., Proc. Bost. Soc. Nat. Hist. xxix. 94, incl. synonymy.

Var. abbreviata, Rob. & Greemn. *G. patens*, var. *abbreviata*, Rob. & Greenm., Proc. Am. Acad. xxix. 387; Proc. Bost. Soc. Nat. Hist. xxix. 94.

Var. **guatemalensis**, Rob. & Greenm. G. *patens*, var. *guatemalensis*, Rob. & Greenm., Proc. Bost. Soc. Nat. Hist. l. c.

Var. **brachypoda**, Rob. & Greenm. *G. patens*, var. *brachypoda*, Rob. & Greenm., l. c. 95.

Var. **macrophylla**, Rob. & Greenm. *G. patens*, var. *macrophylla*, Rob. &. Greenm. l. c.

Gymnolomia Pittieri. Stem somewhat striate, reddish-brown; the younger branches densely short-hirtellous-pubescent, with few scattered hirsutish hairs intermixed: leaves ovate-lanceolate, 4 to 8 cm. long, 1 to 4 cm. broad, acuminate, acute, crenate-serrate, narrowed below into a subpetiolate base, hirsute-hispid above, paler and densely pubescent beneath, 3-nerved from just above the base: heads, including the rays, 5 to 6 cm. in diameter, terminating the stem and branches on upwardly thickened conspicuously striate short-hirtellous-pubescent peduncles: involucre 3-seriate; outer bracts pubescent, shorter than the oblong somewhat petaloid inner ones: ray-flowers conspicuous; rays narrowly oblong, 2 to 2.5 cm. long, 0.5 cm. broad; ray-achenes triangular, glabrous, neutral: disk-flowers numerous; corolla short-tubular, abruptly expanded into a tubular-campanulate limb, externally pubescent: achenes of the disk-flowers glabrous. *G. platylepis*, Rob. & Greenm., Proc. Bost. Soc. Nat. Hist. xxix. 102, in part. — Costa Rica. Défrichements le long du Rio Giliri, pres de San José, 5 December, 1890, *H. Pittier*, no. 3136 in part (hb. Gr); bords du Rio Ceibo à Buenos Aires, altitude 200 m., February, 1891, *H. Pittier*, no. 3735 (hb. Gr.); Ujarras de Buenas Aires, February, 1897, *H. Pittier*, no. 10, 631 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

This species has hitherto been confused with *Gymnolomia platylepis*, Gray, from which, however, it is well distinguished by the smaller leaves and heads, and by the character of the pubescence. The stem and branches of *G. platylepis* are usually pubescent with long spreading pilose or pilose-hirsute hairs, while *G. Pittieri* is densely pubescent with short somewhat hirtellous pubescence.

Zaluzania Pringlei. Shrub: stems covered with a grayish bark; ultimate branches striate, appressed-puberulent, purplish: leaves alternate, petiolate, ovate, 3.5 to 5 cm. long, 2 to 3.5 cm. broad, short-acuminate, obtusish or submucronate-acute, subentire to somewhat crenate-denate, cuneate to subcordate at the base, slightly hispidulous above, puberulent beneath especially on the midrib and nerves; petioles slender, canaliculate, appressed-puberulent, 1 to 1.5 cm. in length: inflorescence a terminal round-topped paniculately corymbose cyme:

heads ovate, 6 to 7 mm. high, discoid: involucre campanulate; bracts of the involucre about 3-seriate, lance-oblong, acutish, appressed-canescent-puberulent: achenes glabrous. — MEXICO. State of Morelos: limestone hills near Jojutla, altitude 925 m., 18 October, 1902, *C. G. Pringle*, no. 8710 (hb. Gr.).

The species here proposed is most nearly related to *Zaluzania discoidea*, Gray, but is readily distinguished by the smaller leaves, more slender petioles; the slight puberulence is not dense and soft-canous-tomentose on the lower leaf-surface.

Aspilia (?) **aggregata.** Perennial: stem terete, covered with a grayish bark; ultimate branches, upwardly appressed-hispid: leaves opposite, oblong-oblanceolate, 2 to 4 cm. long, 0.5 to 1 cm. broad, acute, entire or inconspicuously denticulate, revolute-margined, narrowed below into a subpetiolate base, tuberculate-hispid above and on the midrib and nerves beneath: heads discoid, about 1 cm. high, 0.5 cm. in diameter, aggregated at the ends of long slender almost naked peduncles: involucres cylindrico-campanulate, 8–10-flowered; bracts of the involucre 4–5-seriate, ovate, short-acuminate and acute to oblong and obtuse or rounded at the apex, more or less strigose-hispid on the outer surface; the outer or lowermost bracts shorter and not unfrequently slightly herbaceous, the inner purplish or somewhat magenta-colored, noticeably ciliate toward the apex with brownish hairs: corollas glabrous; tube slender, gradually ampliated above into a 5-dentate limb: achenes subterete or slightly compressed laterally, constricted above and bearing a lacerate-margined cup-shaped persistent pappus: mature achenes 2 to 3 mm. long, hispidulous under a lens. — MEXICO. State of Jalisco: between Balaños and Guadalajara, 20 September, 1897, *Dr. J. N. Rose*, no. 3029 (hb. Gr., and hb. U. S. Nat. Mus.)

The plant here described has, as far as examined, constantly discoid heads, and in the character of achene and pappus might be equally well referred to either *Wedelia* or *Aspilia*. In habit, however, it seems to approach rather more closely the latter genus, and in specific relationship suggesting the Brazilian species *Aspilia floribunda*, Baker.

Aspilia stenophylla. An herbaceous perennial: stems erect, 5 to 7 dm. high, slender much-branched, appressed-hirtellous-pubescent, in the dried state reddish: leaves lanceolate or linear, 8 to 12 cm. long, 3 to 10 mm. broad, acute, entire or inconspicuously denticulate, slightly revolute-margined, subsessile or narrowed at the base into a short petiole, appressed-hispidulous-pubescent on both surfaces: heads about 1 cm. high, including the rays 1.5 to 1.8 cm. in diameter, terminating the stems and

branches, usually on long slender peduncles: involucre 3-seriate; bracts of the involucre narrowly ovate-lanceolate, about 8 mm. long, acute, appressed-pubescent; the outer sometimes a little shorter; the innermost more oblong and thinner: ray-flowers neutral, few, 5 to 8, yellow: disk-flowers 20 to 30; pales of the receptacle somewhat keeled, and purplish along the median line: achenes pubescent, maculate with purple-magenta patches. — MEXICO. State of Chihuahua: in the Sierra Madre, near Seven Star Mine, altitude 2450 m., 28 August, 1899, *Townsend & Barber*, no. 380 (hb. Gr.). This species is nearly allied to *Aspilia angustifolia*, Gray, but it differs in the longer, less pubescent leaves, and in the more acuminate outer bracts of the involucre.

Viguiera brevifolia. A much-branched shrub, 1 m. or less in height: stems terete, covered with a grayish bark; ultimate branches canous-strigose: leaves opposite below, alternate above, lanceolate-triangular to somewhat ovate, acute to obtuse, entire or subcrenate and revolute-margined, mostly abruptly narrowed at the base into a short petiole, densely appressed-canous-pubescent on both surfaces, especially beneath and on the short petioles: heads 1 cm. or less high, terminating the stem and branches, on long slender peduncles, radiate, including the rays about 1.5 cm. in diameter: involucre campanulate; bracts of the involucre 2–3-seriate, lanceolate to ovate, acute, about 4 mm. long, externally canous-appressed-pubescent: ray-flowers 8 to 10; rays oblong, 6 to 7 mm. long, yellow: disk-flowers numerous, 50 to 60: pappus of two slender aristæ, equalling or slightly exceeding the intermediate lacerated scales: mature achenes 3 mm. long, sparingly pubescent. — MEXICO. State of Durango: Mapimi, 21 to 23 October, 1898, *Dr. Edward Palmer*, no. 527 (hb. Gr., and hb. U. S. Nat. Mus.).

In general habit this species most resembles the Lower Californian *Viguiera microphylla*, Vasey & Rose, but is readily distinguished from it by the character of the inflorescence.

VIGUIERA CORDIFOLIA, Gray, var. **latisquama.** Habit, cauline, foliar and inflorescence characters of the type of the species: involucral bracts imbricated, 3-seriate, linear-oblong, 2 to 3.5 mm. broad, somewhat rounded or very abruptly narrowed at the tip and terminated by a mucro; the outer bracts shorter than the inner ones: floral and achenial characters of the species proper. — MEXICO. State of Durango: vicinity of the City of Durango, September, 1896, *Dr. Edward Palmer*, no. 667, and no. 747 (hb. Gr.).

A very distinct variety, and possibly worthy of specific rank.

Viguiera eriophora. Stem somewhat ligneous, covered with a brownish bark; branches and branchlets reddish-brown, striate, more or less compressed, tomentulose, lanate at the nodes as well as on the petioles with long woolly hairs: leaves mostly opposite, ovate to ovate-lanceolate, including the petiole 5 to 16.5 cm. long, 1 to 8 cm. broad, acuminate, acute, coarsely and irregularly dentate, abruptly contracted at the base and more or less decurrent on the petiole, tuberculate-hispid above, hirsute-pubescent beneath, 3-nerved, rather prominently reticulate-veined on the under surface: inflorescence a terminal many-headed subcorymbose cyme; peduncles 0.5 to 3 cm. in length, hirsute-pubescent: heads large, including the bright yellow rays fully 4 cm. in diameter, 1 to 1.5 cm. high; involucral scales 3–4-seriate, lance-oblong, short-acuminate, acute, tomentulose to nearly or quite glabrous, conspicuously ciliate, the outer scales somewhat shorter: ray-flowers 6 to 8: disk-flowers numerous: achenes densely appressed-sericeous-villous. — MEXICO. State of Oaxaca: hills of Telixtlahuaca, altitude 2000 m., 18 October, 1895, *Rev. Lucius C. Smith*, no. 971 (hb. Gr.); without locality, 21 October, 1899, *E. W. D. Holway*, no. 3689 (hb. Gr.), July–August, 1900, *Conzatti & González*, no. 987 (hb. Gr.).

In general appearance *Virguiera eriophora* resembles certain species of *Helianthi*, but in the technical characters of the head it is distinctly a *Viguiera*.

Viguiera Goldmanii. Stem erect, strict, striate, brownish, glabrous or slightly puberulent above: leaves opposite, subsessile, oblong-lanceolate, 5 to 8 cm. long, 1 to 2.5 cm. broad, acuminate, acute, entire or inconspicuously denticulate, subcordate at the base, sparingly hispidulous on both surfaces, distinctly 3-nerved: inflorescence a loose di-trichotomously branched corymbose cyme: heads 10 to 12 mm. high, radiate, including the rays about 2.5 cm. in diameter: involucre subcylindrical, slightly shorter than the flowers of the disk: bracts of the involucre 4–5-seriate, ovate-oblong to typically oblong, obtuse to rounded at the apex, yellowish green, glabrous and striate, short-ciliate: ray-flowers commonly 8; rays oblong, about 1 cm. long: pappus of two paleo-aristate awns, much longer than the intermediate lacerated scales: achenes densely appressed-sericeous-pubescent. — MEXICO. State of Durango: Chalco, altitude about 1000 m., 7 March, 1899, *E. A. Goldman*, no. 359 (hb. Gr.).

A species resembling *Viguiera montana*, Rose, but readily distinguished by the more rounded and less ciliated involucral scales, and by the less attenuated foliage.

Viguiera hypargyrea. Stem terete, substriate, upwardly appressed-pubescent: leaves alternate, sessile or subsessile, lanceolate, acuminate, acute, 2.5 to 6 cm. long, 0.5 to 1.5 cm. broad, entire, rounded or obtuse at the base, indistinctly 3-nerved, appressed-hirsute above, densely soft-sericeous beneath: heads solitary, terminating the stems, 1.5 to 2 cm. high, excluding the rays 2 to nearly 3 cm. broad at least in the later stages: involucre campanulate, 2–3-seriate; bracts of involucre imbricated, lance-oblong, acute, externally sericeous-pubescent, the outer bracts a little shorter than the inner: ray-flowers neutral; rays oblong, 12 mm. long, 4 to 5 mm. broad: disk-flowers numerous: corollas 6 mm. long, abruptly and conspicuously ampliated above the short pubescent tube: mature achenes about 5 mm. long, densely appressed-sericeous-pubescent; pappus of two subpaleaceous awns with intermediate erose scales, persistent. — MEXICO. State of Durango: City of Durango and vicinity, April to November, 1896, *Dr. Edward Palmer*, no. 816 (hb. Gr., and hb. U. S. Nat. Mus.).

Viguiera microcephala. Stems herbaceous, 1 to 2 m. high, slender, erect, much-branched, striate, reddish-brown, strigose-pubescent: leaves alternate, at least the upper ones, petiolate, ovate, 3 to 6 cm. long, 1 to 3.5 cm. broad, acuminate, acute, somewhat sinuate-dentate with more or less spreading teeth, cuneate to subcordate at the base, appressed-pubescent on both surfaces; petioles 12 mm. or less in length, canous-strigose: heads small, 6 to 7 mm. high, radiate, including the rays 1 cm. or less broad, disposed in few-headed cymes at the ends of the slender branchlets: involucre 1–2-seriate; bracts lanceolate or narrowly ovate-acuminate, 4 to 5 mm. long, appressed-pubescent: ray-flowers 5, neutral; rays yellow, broadly ovate or subrotund, 3 to 4 mm. long, nearly or quite as broad, 4-nerved: disk-flowers 12 to 14: pappus of 2 aristæ with 2 intermediate laciniate scales on either side of the achene: achenes thickish, sub-4-angled, 2 mm. long, at first appressed-silky-villous, later glabrous or nearly so. — MEXICO. State of Morelos: limestone hills near Yantepec, altitude 1385 m., 7 November, 1902, *C. G. Pringle*, no. 8717 (hb. Gr.).

In general aspect *V. microcephala* suggests *V. tenuis*, Gray, and *V. helianthoides*, HBK., but the heads are more numerous and smaller than in either of these species.

Viguiera Rosei. Stems densely white-lanate-tomentose: leaves alternate, sessile, half clasping the stem by a broad auriculate base, oblong-lanceolate, attenuate, 1 to 2.2 dm. or more long, 1.5 to 6 cm. broad, acute, entire to remotely denticulate, conspicuously reticulate-veined and

appressed-hirsute-pubescent above, rather densely soft-tomentose beneath: heads large, about 2 cm. high, 4 to 5 cm. broad, terminating the stem and branches on 2 to 6 cm. long slightly thickened upwardly densely white-lanate peduncles: involucre campanulate; bracts of the involucre 2–3-seriate, lance-attenuate, 3 cm. or less in length, about 5 cm. in breadth, more or less foliaceous and recurved at the tip, sericeous-pubescent: ray-flowers about 16, neutral; rays 12 to 15 mm. long, 5 mm. broad: disk-flowers numerous: pappus of 1 or 2 unequal subpaleaceous deciduous awns and shorter deeply lacerated intermediate persistent scales: corollas apparently roseate or somewhat pink in color: mature achenes about 6 mm. long, densely appressed-pubescent. — MEXICO. State of Zacatecas: near Plateado on the road from Colatlan, 31 August, 1897, *Dr. J. N. Rose*, no. 2710 (hb. Gr., and hb. U. S. Nat. Mus.).

Notwithstanding the superficial resemblance this plant bears to the genus *Tithonia*, on account of the robust habit and large heads, the real affinity seems to be with the genus *Viguiera*, and is closely related to *V. decurrens*, Gray, and *V. excelsa*, Benth. & Hook. The writer takes pleasure in dedicating the species to its collector, Dr. J. N. Rose of the U. S. National Museum, Washington, D. C.

Altamirania, n. gen. of *Compositæ* (*Verbesineæ*). Heads heterogamous, radiate. Involucre campanulate; bracts 2–3-seriate. Receptacle convex or conical; pales of the receptacle conduplicate, keeled. Ray-flowers uniseriate, fertile; achenes triangular. Corollas of the disk-flowers regular; tube short, ampliated above into an elongated-cylindrical 5-toothed limb. Anthers minutely dentate at the base, appendaged at the apex. Style-branches obtuse. Achenes of the disk-flowers laterally compressed-4-angled. Pappus of 2 to 3 paleaceous awns, with 1 to 3 lacerated scales between, persistent. Erect suffruticose (?) plants with opposite leaves and terminal cymose inflorescence.

A. pachyphylla. An erect suffruticose (?) plant, glabrous throughout, or slightly puberulent on the peduncles: stem striate, purplish: leaves lanceolate or somewhat oblanceolate, 5 to 12 cm. long, 1.5 to 3.5 cm. broad, acute or acuminate-acute, dentate, narrowed below to a subpetiolate base, smooth on both surfaces, dark- or somewhat olive-green above, paler beneath: heads 1 cm. or less high, including the rays 3 to 4 cm. in diameter, disposed in terminal compound corymbose cymes: involucral scales linear, obtusish, slightly thickened and more or less spreading: ray-flowers 8 to 10; rays narrowly oblong about 1.5 cm. long, 3 mm. broad: disk-flowers numerous; the paleaceous awns about one-half as long as the corolla; achenes tapering toward the base, cilio-

late on the margins, glabrous on the surface, at maturity 3 to 4 mm. in length. ? *Aspilia pachyphylla*, Klatt, Leopoldina, xxiii. 143 (reprint, p. 4). — MEXICO. State of Oaxaca: near Totontepec, altitude 1125 to 1625 m., 15 to 28 July, 1894, *E. W. Nelson*, no 829 (hb. Gr., and hb. U. S. Nat. Mus.).

But for the fertile ray-flowers and the diverse habit the plant here described might be referred to the genus *Viguiera*. From *Encelia* it differs in the character of the ray-flowers, and in the distinctly 4-angled achenes of the disk-flowers. From *Verbesina* it differs in the achenial characters, namely, in being 4-angled and not distinctly winged, and also in the nature of the pappus. Although bearing a certain affinity with the three genera here mentioned, it differs in the important characters enumerated, hence it seems best to give it generic rank with a position in the natural sequence near *Viguiera*.

The genus is dedicated to Dr. Fernando Altamirano, Professor at the School of Medicine, and Director of the National Medical Institute, City of Mexico.

Helianthus oaxacanus. Stems striate, terete and glabrous below, subangled and minutely appressed-puberulent above, especially in the inflorescence: leaves alternate (at least the upper ones), petiolate, broadly ovate, acute, 4 to 14 cm. long, 2 to 8 cm. broad, dentate to subentire, often revolute-margined, rounded or abruptly narrowed at the base into a 1 to 3.5 cm. long petiole, glabrous or essentially so on both surfaces, 3-nerved: inflorescence a terminal comparatively few-headed leafy paniculate cyme: heads large, 1.5 to 2 cm. high, including the rays 4 to 5 cm. in diameter: involucre campanulate; bracts of the involucre 2–3-seriate, imbricated, lanceolate, acuminate, acute; the outer bracts shorter than the inner ones; ray-flowers 12 to 15, neutral; rays yellow, oblong, 1.5 cm. or more long, 6 to 7 mm. broad: disk-flowers numerous: pappus of two rather large unequal paleaceous awns with smaller intermediate persistent erose scales: achenes appressed-sericeous pubescent. — MEXICO. Between Huajuapam, State of Oaxaca, and Retlatzingo, State of Puebla, altitude 1450 to 2000 m., 19 November, 1894, *E. W. Nelson*, no. 1985 (hb. Gr., and hb. U. S. Nat. Mus.).

HELIANTHUS PETIOLARIS, Nutt. Jour. Acad. Phil. ii. 115. Specimens referable to this species were collected by *Townsend & Barber* in the Sierra Madre near Rio de Aroz, State of Chihuahua, Mexico, altitude 2300 m., 3 September, 1899, no. 403 (hb. Gr.). The specimens at hand agree well with the more northern representatives of the species, except for the somewhat narrower involucral bracts in which character they approach the variety *canescens*.

HELIANTHUS PETIOLARIS, Nutt., var. CANESCENS, Gray, Pl. Wright. i. 108; Syn. Fl. i. pt. 2, 272. Mr. E. W. Nelson collected near Casas Grandes, State of Chihuahua, Mexico, 30 August, 1899, specimens under no. 6328 (hb. Gr., and hb. U. S. Nat. Mus.), which, except for a slightly more pronounced dentation of the leaves, accord well with the type of the above variety.

The locality not only extends considerably the geographical range of the variety *canescens*, but adds another *Helianthus* not hitherto recorded from Mexico.

Perymenium macrocephalum. Stout herbaceous perennial, pubescent throughout with more or less spreading stiff hairs; stem and branches mottled with reddish-brown patches: leaves opposite, petiolate, ovate, 5 to 10 cm. long, 3 to 7 cm. broad, acuminate, acute, rather remotely and shallowly dentate, rounded or cuneate at the base, hispid above, paler and hirsute-hispid on the conspicuously reticulated veins beneath; petioles 0.5 to 2.5 cm. long, narrowly winged by a continuous prolongation of the leaf-blade: heads few, on long peduncles 1 to 10 cm. in length; scales of the involucre 3–4-seriate, ovate to oblong, obtuse, externally appressed-pubescent, ciliate, the outer shorter: ray-flowers about 13, fertile; rays yellow: disk-flowers numerous: mature achenes 4 to 5 mm. long, somewhat roughened on either surface: pales of the receptacle conspicuous, especially in the later stages. — MEXICO. State of Guerrero: limestone mountains above Iguala, altitude 1230 m., 27 September, 1900, *C. G. Pringle*, no. 8416 (hb. Gr.). This species suggests in some respects *Montanoa macrolepis*, Rob. & Greenm., but in the technical characters it is quite distinct.

PERYMENIUM RUDE, Rob. & Greenm., Proc. Am. Acad. xxxiv. 526. Specimens collected near Tequila, State of Jalisco, Mexico, 5–6 July, 1899, by *Dr. J. N. Rose & Mr. Walter Hough*, no. 4749 (hb. Gr., and hb. U. S. Nat. Mus.), agree in all essential details with the original specimen, and with the first published description of this species. In the above cited number, however, the leaves are often 4 cm. in length, and 3 cm. in breadth, thus somewhat larger than was indicated in the original description.

SPILANTHES DISCIFORMIS, Rob., var. **phaneractis.** Stems ascending, 2.5 to 8 dm. long, rooting at the lower nodes: leaves narrowly lanceolate, 8 cm. or less in length, 8 mm. in breadth: peduncles slender, 7 to 13 cm. long: rays conspicuous, sulphur-yellow, 5 to 6 mm. long, 2 to 3 mm. broad. — MEXICO. State of Michoacan: swamps, Zamora, altitude 1540 m., 1901, and 24 July, 1902, *C. G. Pringle*, nos. 9539, 8637 (hb. Gr.).

Spilanthes macrophylla. Stems erect or nearly so, 2.5 to 6 dm. high, striate, sparingly pubescent with spreading hirsute hairs, glabrate: leaves opposite, petiolate, ovate-lanceolate, 5 to 15 cm. long including the petiole, 1.5 to 4 cm. wide, acuminate, acute, entire to rather conspicuously sinuate-dentate, narrowed at the base into a slender ciliate petiole, glabrous on both surfaces or with a few scattered hirsute hairs on the midrib and veins beneath, membranous: heads radiate, 8 to 10 mm. high, on long axillary and terminal somewhat sulcate sparingly subappressed-hirsute 2 to 15 cm. long peduncles: involucre, 2-seriate; scales of the involucre linear-lanceolate, 4 to 7 mm. long, acute, externally hirsute-pubescent: ray-flowers about 10; rays yellow: disk-flowers numerous: achenes about 2 mm. long, bearing two slender pappus-awns, ciliate on the margins, sparingly appressed-pubescent on both surfaces. — COSTA RICA. Bord du Rio del Volcan, 2 February, 1891, *H. Pittier*, no. 3717 (hb. Gr.); Salutre de San Murios, altitude 1355 m., *Ad. Tonduz*, no. 7831 (hb. Gr.); Alto del Sacatæ, Cerro de Buena Vista, January, 1897, *H. Pittier*, no. 10,546 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.). *Pittier's* no. 3717 and *Tonduz's* no. 7831, both of the Pittier and Durand, "*Plantæ costaricensis exiccatæ*," were referred by Klatt to *Spilanthes Mutisii*, HBK., a South American species from which, however, the Costa Rican plant differs materially in the character of the involucral scales.

SPILANTHES URENS, Jacq. Am. Stirp. 214, t. 126, f. 1; HBK. Nov. Gen. & Sp. iv. 211; DC. Prodr. v. 625. Specimens collected at Altata, State of Sinaloa, Mexico, by *Dr. J. N. Rose*, 15 June, 1897, without number (hb. Gr., and hb. U. S. Nat. Mus.), accord in all important details with the above maritime species, which has not been recorded hitherto from Mexico.

Encelia adenophora. Stout herb, 1 to 2.5 m. high, pubescent throughout with stipitate glands intermixed with horizontally spreading hirsute hairs: lower leaves opposite, petiolate, ovate to deltoid-ovate, 5 to 12 cm. long, 3 to 10 cm. broad, more or less acuminate, acute, rather coarsely and somewhat unequally dentate, 3-nerved from or just above the base; petioles 6 cm. or less in length, naked; upper leaves gradually smaller, shorter-petioled, becoming lanceolate-oblong, more acuminate and remotely dentate to subentire: inflorescence a subcorymbose, or paniculate cyme; peduncles 0.5 to 7 cm. long: heads 12 to 17 mm. high, 1.5 to 2.5 cm. in diameter: involucre campanulate; bracts of the involucre lance-attenuate, 10 to 12 mm. long, subequal or the outer bracts slightly exceeding the inner: ray-flowers about 12; rays pale

yellow, 8 mm. long, one-half as broad, longer than the slender sterile achene: disk-flowers numerous, about 50; corollas pale yellow or sometimes slightly tinged with purple: mature achenes 5 mm. long, 3 mm. broad. — MEXICO. State of Jalisco: fields and copses, Tequila, September–October, 1893, *C. G. Pringle*, no. 4602 (hb. Gr.). State of Guerrero: between Tlapa and Tlaliscatilla, altitude 1200 to 1400 m., 5 December, 1894, *E. W. Nelson*, no. 2045 (hb. Gr., and hb. U. S. Nat. Mus.). State of Oaxaca: hills of Soledad de Etla, altitude 1850 m., 19 November, 1895, *L. C. Smith*, no. 894 (hb. Gr.).

This species has hitherto been confused with *Encelia mexicana*, Mart., and Mr. Pringle's specimen above cited was distributed as "*Encelia mexicana*, Mart., var." From that species, however, *E. adenophora* is amply distinct, being readily separated by the pale yellow color of the entire plant, the larger, more numerously flowered heads, the attenuated involucral scales, and finally by the copious stipitate-glandular hairs of stem, leaves and inflorescence.

Encelia angustifolia. An herbaceous perennial: stem simple, erect from a ligneous base, 3 to 4 dm. high, glabrous, striate, more or less purplish: leaves alternate or scattered, linear or linear-lanceolate, 1.5 to 8 cm. long, 1.5 to 3 mm. broad, acute or acutish, remotely and inconspicuously serrulate, appressed-hirtellous above, glabrous beneath, 3-nerved; nerves rather prominent especially on the lower leaf-surface: heads radiate, about 1 cm. high, excluding the rays about 6 mm. in diameter, terminating the stems on slender peduncles: involucre 1–2-seriate; bracts of the involucre lance-linear, subequal, shorter than the flowers of the disk: ray-flowers about 5; rays narrowly oblong, 10 to 12 mm. long, yellow: disk-flowers comparatively few: achenes strongly compressed laterally, ciliate-margined. — MEXICO. Territory of Tepic: in the Sierra Madre, 13 August, 1897, *Dr. J. N. Rose*, no. 3453 (hb. Gr., and hb. U. S. Nat. Mus.).

A very characteristic species, which on account of the narrow attenuated leaves and the few heads, is easily distinguished from all the described species of the genus.

Encelia collodes. Suffruticose: stem covered with a brownish bark: branches striate, or striate-angled puberulent or essentially glabrous: leaves alternate, petiolate, lanceolate or oblong-lanceolate, 5 to 12 cm. long, 1.5 to 5 cm. broad, acuminate, acute, entire, narrowed at the base into a 0.5 to 1.5 cm. long petiole, glabrous above, puberulent on the prominent midrib and nerves beneath, firm in texture: inflorescence a terminal few-headed subcorymbose cyme: heads rather large, pedun-

culate, 1.5 to 2 cm. high, 5 cm. in diameter: involucre about 4-seriate; bracts of the involucre lance-oblong, acute to obtuse, thickish, striate, externally somewhat tawny pubescent and as well as the corollas and pales of the receptacle more or less glutinous: ray-flowers 12 to 16, conspicuous: disk-flowers numerous: achenes strongly compressed laterally, sparingly hirsute-pubescent on both surfaces, long-ciliate on the margins. — MEXICO. State of Chiapas: along road from Ocuilapa to Tuxtla, altitude 600 to 1000 m., 29 August, 1895, *E. W. Nelson*, no. 307, (hb. Gr., and hb. U. S. Nat. Mus.).

The affinity of *E. collodes* seems to be with *E. glutinosa*, Rob. & Greenm., and *E. Pringlei*, Fernald. From the former it is distinguished by the larger and fewer heads, longer involucral scales, and by the absence of the long sericeous hairs on the young shoots; from the latter it is readily separated by the foliar characters.

Encelia Conzattii. Perennial: stem covered with a grayish bark; branches and branchlets purplish, slightly compressed particularly at the nodes, striate, closely and minutely appressed-strigulose: leaves opposite, short-petiolate, lanceolate, 5 to 10 cm. long, 1 to 2.5 cm. broad, acuminate, acute, remotely denticulate, narrowed below into a crisp-undulate base, dark green and puberulent above, pale and closely canous-pubescent beneath: inflorescence a terminal leafy subcorymbose or paniculate cyme: heads including the sulphur-yellow rays 2 to 2.5 cm. in diameter, 1 cm. or less high, on densely canous-pubescent peduncles 0.5 to 3 cm. in length; involucral scales 2–3-seriate, the outer scales subfoliaceous; ray-flowers usually 6: disk-flowers about 35: achenes sparingly pubescent on both surfaces, conspicuously ciliate on the margins. — MEXICO. State of Oaxaca: altitude 1750 m., July–August, 1900, *Conzatti & González*, no. 1007 (hb. Gr.).

Encelia pilosa. Annual: stem erect, purplish or stramineous, hispidulous-pubescent with long pilose hairs intermixed, somewhat stipitate-glandular especially in the inflorescence: lower leaves opposite, petiolate, broadly ovate, 3 to 14 cm. long, fully two-thirds as broad, acute, subentire to crenate-dentate, hirsute-hispid above, hirtellous-pubescent beneath, 3-nerved from the base; petioles neither winged nor auricled, usually bearing long pilose hairs; upper leaves gradually reduced and shorter-petioled: inflorescence a many-headed nearly naked subcorymbose or paniculate cyme: heads radiate, 10 to 12 mm. high: scales of the involucre imbricated in 3 to 4 series, more or less purplish colored, externally pubescent, the outer scales ovate, acute, shorter than the inner lanceolate ones: ray-flowers, commonly 5; rays yellow, elliptic-oblong,

excluding the short tube 6 mm. long, 4 mm. broad; ray-achenes slender, 6 mm. long: disk-flowers 20 to 25; corolla yellow or purplish: mature achenes 4 to 5 mm. long, appressed-pubescent on both surfaces, ciliate. — MEXICO. State of Oaxaca: 17 October, 1899, *E. W. D. Holway*, no. 3747 (hb. Gr.), and 25 October, 1899, no. 3740 (hb. Gr.); altitude 1750 m., July–August, 1900, *Conzatti & González*, no. 1002 (hb. Gr.); Ocotlan, December, 1901, *Conzatti & González*, no. 1263 (hb. Gr.); between Coixtlahuaca and Tamazulapam, altitude 2000 to 2500 m., 12 November, 1894, *E. W. Nelson*, no. 1937 (hb. Gr., and hb. U. S. Nat. Mus.); Valley of Etla, altitude 1700 m., 23 October, 1895, *L. C. Smith*, no. 854 (hb. Gr.).

Encelia squarrosa. Perennial, 4 to 6 m. high: stem slightly furrowed, tawny pubescent: leaves opposite, petiolate, ovate, 8 to 15 cm. long, 5 to 8 cm. broad, acuminate, dentate, cordate, dark green and hirsute-hispid above, paler and hirsute-tomentose beneath, 3–5-nerved from or just above the base; petioles 2 to 3 cm. in length: inflorescence a terminal corymbose cyme: heads large, about 1.5. cm. high, including the rays 5 to 6 cm. broad: involucre 3–4-seriate; scales of the involucre lanceolate, shorter than the flowers of the disk, acute, strongly squarrose, thickened at the base, ciliate, pubescent on the outer surface: ray-flowers neutral, about 20, yellow; pappus of slightly unequal scales, more or less united, shorter than the triangular sterile achenes; rays oblong, 1.5 cm. long, 6 mm. broad: disk-flowers numerous; pappus of two paleaceous awns with two or three intermediate scales, persistent: achenes strongly compressed, pubescent on both surfaces, ciliate. — MEXICO. State of Guerrero: mountains above Iguala, altitude 1230 m., 11 October 1900, *C. G. Pringle*, no. 8390 (hb. Gr.).

HELIANTHELLA QUINQUENERVIS, var. ARIZONICA, Gray, Syn. Fl. i. pt. 2, 284. Specimens collected by E. W. Nelson, on the Sierra Madre of S. W. Chihuahua, Mexico, about 95 km. south of Guadalupe and Calvo, altitude 2000 to 2500 m., August, 1898, no. 4808 (hb. Gr., and hb. U. S. Nat. Mus.), are clearly to be referred to the variety *arizonica* of the above species. This variety does not seem to have been hitherto reported from Mexico.

Verbesina madrensis. An herbaceous perennial: stems 4 to 6 dm. high, winged below, naked or nearly so above: lower leaves opposite, the upper alternate, elliptic-oblong to oblong-lanceolate, 3 to 10 cm. long, 1 to 4 cm. broad, obtuse, crenate-dentate, decurrent on the stem, hirsute-hispid on both surfaces especially above, prominently reticulate-nerved: heads one to few, terminating the stem and branches on

long naked or subnaked, hirsute-hispid peduncles, 1 to 1.5 cm. high, including the rays 3 to 4 cm. in diameter: involucre 2–3-seriate; bracts of the involucre subequal, linear-oblong, obtuse or obtusish, a little shorter than the flowers of the disk, externally hirsute-pubescent: ray-flowers about 12, neutral; rays conspicuous, yellow, 1 to 1.5 cm. long, 4 to 6 mm. broad: disk-flowers numerous; pappus reduced to two inconspicuous knobs: achenes glabrous. — MEXICO. Territory of Tepic: in the Sierra Madre, between Santa Gertrudés and Santa Teresa, 8 August, 1897, *Dr. J. N. Rose*, no. 3378 (hb. Gr. & hb. U. S. Nat. Mus.).

A species belonging to the § *Pterophyton*, and most nearly related to *V. capitaneja*, Nees.

Eryngiophyllum, n. gen. of *Compositæ* (*Coreopsideæ*). Heads heterogamous, radiate. Involucre campanulate; bracts 2–3-seriate, free or very slightly united at the base. Receptacle flat or somewhat convex, paleaceous; pales thin, membranous. Ray-flowers uniseriate, fertile; achenes subtriangular. Disk-flowers regular; corolla-tube short, gradually ampliate above into an elongated-campanulate 5-toothed limb; achenes densely compressed. Anthers obtuse at the base, appendaged at the apex. Style-branches hirtellous-elongate-appendaged; stigmatic-lines short. Pappus obsolete. Herbaceous perennials with radical leaves and cymose inflorescence.

E. Rosei. Leaves densely rosulate from the crown of a deep perennial root, often somewhat falcate, linear-lanceolate, 3 to 12 cm. long, 5 to 8 mm. wide, undivided or bearing one or more arcuate-ascending lateral divisions, mucronate-acute, entire, somewhat cartilaginous-margined, ciliate, glabrous on both surfaces, more or less areolate: inflorescence axillary scapoid compound bracteate cymes, exceeding the leaves: heads about 1 cm. high, 2.5 cm. broad, on glabrous or slightly hirtellous peduncles 2 to 8 cm. ong: involucre 2–3-seriate; bracts of the involucre subequal; those of the two outer series subherbaceous, lanceolate, acute, ciliate, much thickened and gibbous at the base: ray-flowers about 20, rays yellow, conspicuously nerved: disk-flowers numerous: pappus quite obsolete or represented by very short protuberances: apical appendages of the anthers short, broad, obtuse: achenes glabrous. — MEXICO. State of Sinaloa; between Rosario and Calomas, 12 July, 1897, *Dr. J. N. Rose*, no. 1618 (hb. Gr., and hb. U. S. Nat. Mus.).

The natural affinity of the genus here proposed is apparently with *Isostigma* and *Chrysanthellum*. In the technical characters of the head, particularly the style-branches, it approaches more closely the latter genus.

Chrysanthellum mexicanum. Annual: stem simple or much-branched, erect or ascending, 1 to 3 dm. high, glabrous or sparingly hirtellous, apparently somewhat glaucous, often purplish at the base: leaves petiolate, tripinnately parted, glabrous on both surfaces, prominently veined; divisions narrow, apiculate-acute: inflorescence a subcorymbose cyme: heads small, 3 to 4 mm. high: involucre subcampanulate, glabrous; scales of the involucre ovate-oblong, acute: outer achenes subterete, the inner strongly ob-compressed, narrowly cartilaginous-margined and conspicuously ciliate. — MEXICO. State of Jalisco: banks of ravines near Guadalajara, 10 September, 1890, *C. G. Pringle*, no. 3259 (hb. Gr.), distributed as "*Chrysanthellum procumbens*, Rich."; Tequila, August, 1886, *Dr. Edward Palmer*, no. 364 (hb. Gr.). State of Chiapas: tableland about Ocuilapa, altitude 1000 to 1200 m., 21 August, 1895, *E. W. Nelson*, no. 3065 (hb. Gr., and hb. U. S. Nat. Mus.). State of Vera Cruz: Orizaba, *Botteri*, without number (hb. Gr.). State of San Luis Potosi, altitude 2000 to 2450 m., *C. C. Parry & Dr. Edward Palmer*, without number, coll. of 1878 (hb. Gr.).

The Mexican and Central American representatives of this genus hitherto have been referred to *C. procumbens*, Rich., which species, as far as the material at hand shows, is confined to the West Indies, Venezuela and Guatemala. *C. mexicanum* is readily distinguished from *C. procumbens* by its more erect, stricter habit, and by the uniformly tripinnatisect leaves. In habit and in foliar characters *C. mexicanum* bears a close resemblance to *C. Indicum*, DC. from which it differs in having smaller, narrowly cartilaginous-margined and conspicuously ciliated achenes.

Bidens bicolor. Stem stramineous, striate, hirsute-pubescent to essentially glabrous, rather freely branched above: leaves pinnately 3–5-parted; divisions ovate to ovate-lanceolate, 1.5 to 5 cm. long, 0.5 to 2 cm. broad, acute to acuminate-acute, dentate, sparingly pubescent to quite glabrous, paler beneath: inflorescence a loose subcorymbose cyme: heads, including the rays, 2.5 to 6 cm. in diameter: involucre biseriate, more or less hirsute; outer involucral scales linear-oblong, subfoliaceous, usually spreading: ray-flowers 5 or 6, neutral; rays oblong, 1.5 to nearly 3 cm. long, dark-nerved in the earlier stages, conspicuously purple-maculate at the base: disk-flowers numerous: pappus retrorsely few-barbed: mature achenes not seen. — MEXICO. State of Oaxaca: altitude 1750 m., July–August, 1900, *C. Conzatti & V. González*, nos. 1008, 1009 (hb. Gr.). Apparently most nearly related to *Bidens grandiflora*, Balb.

Bidens tereticaulis, DC., var. **sordida.** Leaves mostly simple and undivided, rarely deeply 3-parted, sordid-pubescent upon both surfaces more densely so beneath: outer scales of the involucre rusty tomentose. — Costa Rica. Thal des rio Segando, *Hoffmann*, no. 383 (hb. Gr.); forêts de la Mala Via au Copey, April, 1898, *Ad. Tonduz*, no. 12,284 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

Arnicastrum, n. gen. of *Compositæ* (*Helenoideæ*). Heads heterogamous, many-flowered. Involucre campanulate; bracts 2–3-seriate, the outer herbaceous. Receptacle convex, naked. Ray-flowers yellow, ligulate, 2–3-dentate, fertile, epappose; mature achenes numerously ribbed. Disk-flowers with a rather slender tube dilated above into an equally 5-toothed limb: pappus of numerous somewhat unequal barbellate bristles: achenes slightly compressed, 4-angled, many-ribbed. Herbaceous perennials with opposite leaves and rather large heads.

A. glandulosum. Stems erect, 3 to 5 dm. high, mostly branched from the base, striate, hispidulous-pubescent, and above especially on the usually long peduncles bearing long-stipitate purplish glandular hairs: leaves sessile, subamplexicaul, 3–5-nerved from the base, narrowly lanceolate, 2 to 8 cm. long, 3 to 15 mm. broad, entire or sparingly denticulate, hispidulous-pubescent on both surfaces: heads about 1 cm. high, including the rays 3 to 4.5 cm. in diameter; outer involucral scales oblong or oblong-ovate, 10 to 12 mm. long, 5 to 8 mm. broad, obtuse, entire, hirtellous-pubescent on the outer surface; the inner scales mostly longer, sometimes acuminate, membranous: ray-flowers about 10; tube 2 to 3 mm. long, externally pubescent; rays elliptic-oblong, 1.5 cm. long, 6 mm. broad: disk-flowers numerous: pappus-bristles unequal, the longer equalling or exceeding the tube of the corolla: achenes hirtellous-puberulent above, many-ribbed. — Mexico. State of Chihuahua: Sierra Madre, 21 June, 29 July, 1899, *E. W. Nelson*, no. 6102 (hb. Gr., and hb. U. S. Nat. Mus.); Sierra Madre, near Colonia Garcia, altitude 2450 m., 26 July, 1899, *Townsend & Barber*, no. 169 (hb. Gr.).

Var. **vestitum.** Outer scales of the involucre 7 to 9 mm. long, and closely covered with purplish glandular hairs; otherwise like the species proper. — Mexico. State of Durango: 48 km. north of Guanacevi, altitude 2450 to 2775 m., 18 August, 1898, *E. W. Nelson*, no. 4778 (hb. Gr., and hb. U. S. Nat. Mus.). In general habit *Arnicastrum glandulosum*, and the variety *vestitum* resemble certain species of *Arnica* more particularly in the opposite leaves and the rather long internodes. In the technical characters of the head, however, they seem to have their nearest affinity with *Jaumea, Bæria* and *Whitneya.*

Porophyllum calcicola, Rob. & Greenm. Annual, glabrous throughout: stem erect, usually much-branched, green or purplish, more or less glaucous: leaves petiolate, oblong to obovate-subrotund, 0.5 to 3.5 cm. long, 0.5 to 1.5 cm. broad, obtuse or rounded at the apex, entire to somewhat sinuate, bearing 3 to several elliptic-oblong marginal glands, cuneate at the base into the slender 0.5 to 2.5 cm. long petioles: heads about 1.5 cm. high on upwardly enlarged 1 to 3 cm. long peduncles: involucre of 5 linear acute bracts about 13 mm. in length, indigo-blue or plum-colored: flowers 18 to 20, slightly exceeding the involucre; pappus about equalling the slender puberulent greenish corolla-tube; the campanulate limb of the corolla rather deeply 5-lobed, deep purple: mature achenes 6 to 7 mm. long, puberulent. — MEXICO. State of Guerrero: on limestone ledges of mountains above Iguala, altitude 920 m., 24 October, 1900, *C. G. Pringle*, no. 9059 (hb. Gr.), distributed as "*Porophyllum Pringlei*, Rob." State of Morelos: on limestone hills near Yantepec, altitude 1385 m., 8 November, 1902, *C. G. Pringle*, no. 8720 (hb. Gr.). Most nearly related to *Porophyllum Pringlei*, Rob., but differing by the more numerously flowered heads, shorter involucres and flowers, more deeply lobed corolla-tube and shorter mature achenes. The flowers moreover in *P. calcicola* are deep purple not white as in *P. Pringlei*.

Bahia glandulosa. An herbaceous perennial (?), glandular-pubescent throughout: stem erect, 7 dm. or more high, freely branching above, striate: leaves alternate, petiolate, tri- or quaternately compound, including the petiole 2 to 12 cm. long, 10 cm. or less broad; divisions linear to linear-oblong, obtuse; the uppermost leaves often reduced to individual spatulate-linear or linear-obtuse bracts: inflorescence terminating the stem and branches in a many-headed flat-topped corymbose cyme: heads 1 cm. or less high, including the rays about 1.5 cm. in diameter: involucre of 10 to 14 lance-oblong obtuse uniseriate bracts: ray-flowers 15 to 20, pale yellow or whitish: disk-flowers numerous: pappus of 10 to 12 obovate-spatulate and muticus to lanceolate paleo-aristate scales, somewhat variable in length: mature achenes about 3 mm. long, puberulent to essentially glabrous. — MEXICO. State of Durango: vicinity of the City of Durango, April to November, 1896, *Dr. Edward Palmer*, no. 492 (hb. Gr.). State of Chihuahua, on hills and plains near the City of Chihuahua, 24 October, 1885, *C. G. Pringle*, no. 308 (hb. Gr.), distributed as "*Bahia biternata*, Gray."

A species on the one hand resembling *Bahia chrysanthemoides*, Gray, and on the other *B. biternata*, Gray. From the former it is distin-

guished by the presence of the pappus, and the short corolla-lobes; and from the latter by the glandular pubescence throughout instead of being densely hirtellous on stem and leaves with only a few glandular hairs above in the inflorescence.

Tagetes Nelsonii. Stem striate, purplish, glabrous: leaves opposite, petiolate, pinnatisect; divisions 3 to 7, elliptic-lanceolate, 1 to 6 cm. long, 0.5 to 2 cm. broad, acute, sharply and evenly dentate, each tooth bearing a single gland, dark green above, paler beneath, glabrous or slightly puberulent on the upper surface, distinctly crisp-puberulent on the lower surface, evenly glandular-punctate: inflorescence a terminal many-headed corymbose cyme: heads about 1 cm. high, radiate: involucre cylindrical, 5–7-dentate, numerously punctate with oblong-elliptic glands: ray-flowers usually 5, occasionally 6; tube slender, nearly equalling the oblong 0.5 cm. long lamina: disk-flowers 9 to 12: pappus of short, unequal scales: achenes 4 to 5 mm. long, glabrous. — MEXICO. State of Chiapas: near Tumbala, altitude 1200 to 1650 m., 20 October, 1895, *N. W. Nelson*, no. 3314 (hb. Gr., and hb. U. S. Nat. Mus.).

Urbinella, n. gen. of *Compositæ* (*Tagetineæ*). Heads heterogamous, radiate. Involucre campanulate; bracts 1-seriate, free or very slightly united at the base. Receptacle conical, naked. Ray-flowers uniseriate, fertile. Disk-flowers regular; tube slender, gradually ampliated above into a 5-toothed limb. Anthers minutely toothed at the base, appendaged at the apex. Style-branches sublanceolate-appendaged. Achenes of ray- and disk-flowers uniform, terete, many-striate. Pappus paleaceous of 5 to 7 scales, some or none awn-bearing. Small annuals with alternate leaves.

U. Palmeri. Glabrous throughout: stem 0.5 to 2 dm. high, simple or much-branched, more or less purplish: leaves simple and undivided, linear or subterete, 0.5 to 2.5 cm. long, obtusish, bearing 1–several rather conspicuous glands, one of which usually occurs near the tip: heads nodding or erect, 5 to 9 mm. high, including the rays 1 to 1.5 cm. in diameter, terminating the stem and branches on slender peduncles: involucral bracts mostly 5, oblong or obovate-oblong, about 5 mm. long, externally obtusely keeled along the median line, scarious-margined, slightly lacerated or unevenly margined at the rounded tip, bearing 1–several roundish or elliptic-oblong glands: ray-flowers 5; tube slender, 2 mm. long; rays white with a yellowish base, obovate or obovate-cuneate, 5 to 6 mm. long, nearly or quite as broad: disk-flowers few to many (40 or less), light yellow: anthers narrowly appendaged at the tips: scales of the pappus obovate-cuneate to lanceolate, one or two awn-bearing:

achenes 3 mm. long, glabrous or sparingly puberulent. — MEXICO. State of Durango: vicinity of the City of Durango, April to November, 1896, *Dr. Edward Palmer*, no. 793 (hb. Gr., and hb. U. S. Nat. Mus.).

The genus here proposed is related to *Dysodia* and *Hymenatherum*. From the former it differs in the character of the pappus, and from the latter in the fewer scales of the pappus, as well as in the character of the involucre.

The genus is dedicated to Dr. Manuel Urbina, Director of the National Museum, City of Mexico.

Pectis latisquama, Schz. Bip. A low subprostrate herbaceous perennial, numerously branched from a suffruticose base: stems leafy, hirtellous-pubescent: leaves linear or linear-lanceolate, 1 to 2 cm. long, 2 to 3 mm. broad, acute, somewhat revolute-margined, bearing 3 to 5 pairs of cilia near the base, glabrous on both surfaces: heads 10 to 12 mm. high, terminating the stem and branches on 1 to 3 mm. long puberulent naked or bracteate peduncles: scales of the involucre 5, oblong-elliptic or obovate, 6 to 7 mm. long, 4 to 5 mm. broad, rounded at the apex, obtusely keeled, ciliate, more or less purplish-tinged, glabrous: ray-flowers usually 5; tube 2 to 3 mm. long, shorter than the longest of the numerous unequal pappus-bristles; rays orange-yellow, oblong-ovate, 6 to 7 mm. long, 3 to 5 mm. broad: disk-flowers 10 to 20; pappus of numerous bristles, the longer two-thirds as long as the corolla: achenes of both ray- and disk-flowers pubescent. — Acc. to Gray, Proc. Am. Acad. v. 181, name only. *Pectis canescens*, Gray, l. c. xix. 47, in part, as to citation in synonomy, not HBK. *P. canescens*, Fernald, l. c. xxxiii. 82, in part, as to *Schaffner's* no. 85 (hb. Gr.), not HBK. — MEXICO. State of Mexico: Valley of Mexico, *Schaffner*, no. 85 (hb. Gr.). State of Puebla: thin soil, Amozoc, altitude 2100 m., 9 September, 1902, *C. G. Pringle*, no. 8604 (hb. Gr.).

Neurolæna macrocephala, Schz. Bip. acc. to Hemsley, Biol. Cent.-Am. Bot. ii. 233. *Neurolæna semidentata*, Klatt, in Leopoldina, xx. 94 (reprint, p. 7). The type specimens of these two described species are both in the Gray Herbarium, and the identity of the two plants is without question, hence it becomes necessary to retain the older combination and treat the other as a synonym.

Neurolæna macrophylla. Stem sulcate, striate, reddish-brown, appressed-puberulent: leaves alternate, thin or membranous, somewhat rhombic-lanceolate, including the petiole 1.5 to 4 dm. long, 4 to 9 cm. broad, acuminate, shallowly dentate to denticulate, gradually narrowed below into a 1 to 3 cm. long petiole, dark green and sparingly puberulent

on the upper surface, paler and essentially glabrous beneath: inflorescence a terminal compound many-headed corymb: heads discoid, about 1 cm. high, and 0.5 cm. thick, about 20-flowered: involucre 4–5-seriate; bracts of the involucre ovate to ovate-oblong, obtuse, imbricated, the outer bracts shorter than the inner: achenes 2.5 mm. long, somewhat pubescent above. — MEXICO. State of Chiapas: Chicarras, altitude 1000 to 2000 m., 6 February, 1896, *E. W. Nelson*, no. 3766 (hb. Gr., and hb. U. S. Nat. Mus.).

Senecio firmipes. Fruticose: stem leafy, glabrous: leaves scattered, crowded, lanceolate, 2 to 3 cm. long, 4 to 6 mm. wide, acuminate, acute, somewhat pungent-tipped, entire, slightly hirtellous on the margins, narrowed below into an articulate base, glabrous on both surfaces, and somewhat glaucous beneath; the persistent petiole-like portion of the base of the leaves later more or less covering the stem: inflorescence a terminal compound corymbose cyme: heads discoid, 5 to 6 mm. high, 15–20-flowered; involucre of 8 oblong-ovate glabrous thickish obtuse bracts, shorter than the flowers; bracteoles few and appressed to involucre: achenes glabrous. — COSTA RICA. Cerro de la Muerte, altitude 3100 m., January, 1897, *H. Pittier*, no. 10,472 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.); Vueltas, *H. Pittier*, no. 10,505 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.).

This species belongs to the § *Fruticosi*, and of the North American species it is nearest related to *S. vernicosus*, var. *major*, Wedd. In South America, however, it has several congeners, namely, *S. glacialis*, Wedd., *S. pulchellus*, DC., and *S. abietinus*, Willd.

Senecio (§ **Mulgedifolii**) **pterocaulis.** Stem erect, striate, arachnoid-tomentose: leaves alternate, lanceolate or lance-attenuate, 0.5 to 1.5 dm. long, 3 to 13 mm. broad, acute, cartilaginous-denticulate, conspicuously decurrent on the stem, arachnoid-tomentose on both surfaces more densely so beneath; inflorescence terminating the stem and branches in a paniculate many-headed cyme; bracts of the inflorescence linear-attenuate to setaceous: heads 10 to 12 mm. high, discoid, 40–50-flowered: involucre calyculate with minute setaceous bracteoles; bracts of the involucre usually 21, linear, acute, glabrous and stramineous: achenes appressed-sericeous-pubescent. — MEXICO. State of Morelos: in lava fields above Cuernavaca, altitude 2155 m., 24 November, 1902, *C. G. Pringle*, no. 8704 (hb. Gr.).

Lycoseris macrocephala. Stem leafy to the inflorescence, subangulate, striate, at first arachnoid-tomentulose, later glabrate: leaves alternate, short-petiolate, elliptic-lanceolate or somewhat ovate-oblong,

1 to 2 dm. long, 2 to 8 cm. broad, acuminate, acute, serrulate, narrowed at the base into a 3 to 5 mm. long petiole, dark green and glabrous above, arachnoid-tomentulose beneath, pellucid-punctate, subparallel 5-nerved; midrib and the two pairs of lateral nerves prominent on the under side of the leaf-blade: heads of pistillate flowers large, 4 to 5 cm. high, 5 to 7 cm. broad, terminating the stem and branches on short stout peduncles: involucre about 8-seriate, arachnoid-tomentose; scales of the involucre lance-acuminate, appressed or slightly squarrose, the outer successively shorter: rays about 1 cm. long, 2 mm. broad: disk-flowers numerous; pappus of many slender setæ: heads of staminate flowers about 2 cm. high and broad, on short peduncles: involucre 4–5-seriate, arachnoid-tomentose; scales of the involucre lance-oblong, obtuse, appressed or very slightly spreading, the outer shorter than the inner; rays narrowly oblong, 10 to 12 mm. long, 3 mm. broad. — COSTA RICA. Forêts des collines de Nicoya, February, 1900, *Ad. Tonduz*, no. 13,602 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.), pistillate plant; boussailles a Nicoya, January, 1900, *Ad. Tonduz*, no. 13,620 (hb. Gr., and hb. Inst. Phys.-Geog. Cost. Ri.), staminate plant.

Notwithstanding the considerable difference in the size of the heads of the two specimens above cited, the writer has no doubt that they represent the pistillate and staminate plants of one species. In the stem and foliar characters there is absolute identity.

CONTRIBUTIONS FROM THE GRAY HERBARIUM OF HARVARD UNIVERSITY.

NEW SERIES.—No. XXV.

SUPPLEMENTARY LEAFLET.

ON THE GENERIC NAMES URBINELLA AND ALTAMIRANIA.

After my paper "New and otherwise noteworthy Angiosperms from Mexico and Central America" (Proc. Am. Acad. xxxix, 69–120) had passed through press and was being bound, a copy of Britton & Rose's valuable paper "New or noteworthy North American Crassulaceae" (Bull. N. Y. Bot. Gard. iii. 1–45) reached the Gray Herbarium. On examining this pamphlet, received September 24, although dated September 12, I find that these authors have also dedicated new genera to Messrs. Urbina and Altamirano. The generic names proposed by them are *Urbinia* and *Altamiranoa*. Of these *Urbinia* is so different in form from my *Urbinella* that there can certainly be no question of the validity of the latter, just as *Eatonella* is valid although there is an *Eatonia*, and certainly *Urbinella* is less likely to be confused with *Urbinia* than the latter is with the older *Urbania*. On the other hand the names *Altamiranoa* and *Altamirania* are merely different spellings of the same word and would according to recent rules be regarded as homonyms. On this account I here propose the name **Aspiliopsis**, n. gen. of *Verbesineae*, for the plant which I had described as *Altamirania*.

J. M. GREENMAN.

GRAY HERBARIUM, CAMBRIDGE, MASSACHUSETTS.
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